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THE ARCTIC EXPEDITION.

VI.

Necessity for Annual Communication.

Far away, in an unapproachable spot within the unknown region of the pole, there are now wintering two ships, containing 120 of our countrymen, carefully selected from the very pick of the navy. They are enduring great hardships and privations, and are about to face still greater, in order to achieve objects which are very dear to this country. They are actuated by patriotic feelings, by a sense of duty, and by the love of adventure. But they are also supported, in their great work, by confidence in the sympathy of their countrymen, and by the belief that their labours will be appreciated, and their interests cared for at home.

It is necessary for the welfare, perhaps for the safety of the Arctic Expedition, that the measure should be adopted which, after due consideration, the Admiralty has seen the necessity for. It has always been urged by those who advocated the renewal of Arctic exploration that there was no undue risk, provided that the lessons of experience were not disregarded, and that precautions, sanctioned by former precedents, were taken for the safety and welfare of the Expedition. The main precautions are that, while the exploring ship penetrates into the region to be discovered, a depôt vessel should remain at the entrance of Smith Sound, and that a vessel should communicate each summer with the Expedition.

The necessity for these precautions is obvious from a consideration of the facts; and the opinion that this is so, is very strongly held by some of the best and most competent of living Arctic authorities. Among them we may mention Captain R. V. Hamilton, C.B., who served with great distinction in the expeditions of 1850-51 and 1852-54; Captain Haswell, who was first-lieutenant of the 'Investigator,' with M'Clure, and passed four winters in the ice; and Commander Roche, who was in the expedition of 1852-54, an old messmate and intimate friend of Captain Nares.

Experience has proved to these officers, and it is indeed apparent to all who consider the question with care, that such precautions are necessary. The loss of the 'Erebus' and 'Terror,' was due to there being no depôt vessel to fall back upon, and to annual communication not having been kept up. If a ship had been sent out in 1846, after the first winter, it would have been known in what direction the expedition was proceeding. If a ship had been sent out in 1847, after the second winter, with that knowledge, the people would have been saved.

In subsequent expeditions due attention was paid to these essential conditions of safety. In 1849, after Sir James Ross had been absent one winter, the 'North Star' was sent out to communicate with him. When the 'Enterprise' and 'Investigator' were sent up Behring Strait, the 'Plover' was stationed near the entrance as a depôt vessel, and frigates were sent up, regularly every year, from the Pacific Station, to communicate. In the case of Sir Edward Belcher's expedition both precautions were taken. A depôt vessel was stationed within easy reach at Beechey Island, and annual communication was kept up. In 1853, after the first winter, the 'Phœnix' and 'Breadalbane' were sent out to keep open communications, and to bring home invalids and intelligence. In 1854, after the second winter, the 'Phœnix' and 'Talbot' were sent out, and, with the 'North Star,' they brought home all the members of the expedition.

In urging the renewal of Arctic exploration it was on the understanding that these precedents would be borne in mind, and that undue risk would thus be avoided. This condition has been steadily and unceasingly kept in the fore-front of all the arguments for the renewal of Arctic exploration, first by those who urged the matter on the attention of the country, and afterwards in the published memoranda and addresses of the Royal Geographical Society.

When Admiral Sherard Osborn first called attention to the subject, in his paper read on January 23rd, 1865, he said:—"One vessel would be secured near Cape Isabella, the other would be pressed up the western shore, taking care not to exceed a distance of 300 miles from her consort." The necessity for the same precaution was mentioned in another paper read on April 10th, 1865, in an article in the *Quarterly Review* for July 1865 (p. 162), and elsewhere.

In the Memorandum of the Arctic Committee of the Geographical Society of April 29th, 1872, it is laid down that an Arctic expedition should consist of two screw steamers, one to be stationed near the entrance of Smith Sound, the other to proceed to the northward, preserving communication with the depôt vessel. In the second more elaborate memorandum of June, 1873, which had the concurrence of many of the principal Arctic authorities, the same precaution is insisted upon. In the first edition of the *Threshold of the Unknown Region*, dated July 20th, 1873 (p. 270), it is held that by stationing a vessel at the

entrance of Smith Sound all undue risk for the advanced party will be avoided. In his anniversary address of 1872, Sir Henry Rawlinson also referred to the necessity for this precaution (p. ccxxi). On the importance of stationing a vessel at the entrance of Smith Sound, within easy annual communication with England, there was, thus, absolute unanimity up to 1874.

The Admiralty Arctic Committee met in December, 1874, and January, 1875, and advised, contrary to all that had been urged before, that both ships should be pushed forward into the unknown region, and, though one is to be in rear of the other, neither will be a depôt ship in the sense of former recommendations. The Admiralty Instructions (para. 8) are quite clear upon this point:—"Both ships are to share in the objects of discovery and exploration." It is quite true that, by pushing both vessels to the front, a very great advantage is gained in providing increased facilities for exploration. It was this consideration which weighed with the late Admiral Sherard Osborn in originating and recommending the change of plan. But, as he felt and would have said at the fitting time, if he had been spared to us, the advance of both ships necessitates one of two things, in order to secure the Expedition from undue risk. Either a third vessel should be stationed as a depôt ship, at the entrance of Smith Sound, as the 'North Star' was at Beechey Island, or the 'Plover' at Point Barrow; or else a vessel must be sent out, after each winter, to communicate. The question of a third ship was left open by the Admiralty Committee. Nothing was done, and the despatch of a relief ship in 1876 therefore becomes necessary.

On the above arrangement being made known, the following passage was inserted in the third edition of the *Threshold of the Unknown Regions*, in January 1875:—"With modern appliances, and working in the light of former experience, there is no undue danger in Arctic service . . . . At the same time a despatch vessel ought to be sent out, each summer, to keep up communication between the Expedition and England, and to bring home invalids."

The reasons which make these precautions necessary are well known to Arctic officers. "I wonder where we should have been," says Captain Haswell, "had not the 'North Star' been at Beechey Island and the 'Phœnix' communicating with her each year; and why should that good system not be adhered to in the present expedition." Why indeed!

The reasons why the present expedition should be treated with the same consideration as its predecessor are strong and unanswerable. In the first place it is possible that serious accidents may have happened to both ships. It is more probable that one of the ships may have been destroyed; when both crews would be crowded together, and it would be a matter of urgency to bring home a portion. In either case the precaution is necessary of sending a vessel to communicate in 1876.

Secondly, it is contemplated by the Admiralty (Instructions, para. 17) that the ships may be finally separated owing to a sudden or unforeseen movement of the ice, resulting in the 'Alert' being drifted far to the eastward. If this event does happen, and communication is cut off between the two ships in the spring of 1876, it will be a matter of life and death that the fact should be known in England by the autumn of the same year. It may be considered necessary, from the nature of the intelligence, that succour should be sent to the east coast in 1877. But if no intelligence is obtained in 1876, there will be want of knowledge—possibly a fatal want—in 1877. For this alone the despatch of a vessel to Smith Sound in 1876 is a duty.

Thirdly, a vessel must be sent out in 1876, in case there are any invalids to bring home, who would otherwise lose their lives from being exposed to a second winter. With proper arrangements there is no danger to health in the first winter, and there are many instances, like that of Captain Austin's expedition, of there being no deaths nor even sickness. But after the trying work of the spring and summer travelling, it is very different. There is only one instance on record of a ship in the Arctic Regions passing through a second winter without a death. This sacrifice of life is unnecessary, and to prevent it a vessel ought always to be sent out to communicate after the first winter. The 'Phœnix' went out in 1853, after the first winter of Sir Edward Belcher's expedition, and brought home invalids, including five officers, ten men from the 'Resolute,' and several from the 'North Star.' A vessel ought also to be sent to the entrance of Smith Sound in 1876, in case it should have been necessary to send home any invalids. A single death owing to neglect of this obvious precaution, will have been a perfectly avoidable calamity. It is true that, owing to the absence of a depôt ship like the 'North Star,' at the entrance of Smith Sound, it may be out of the question to send down invalids to Littleton Island. Yet some may be able to reach that point, and the bare chance is sufficient.

Fourthly, no wise government can ignore the moral effect of a measure on the men who are serving under it. With no news from home, no sign of carefulness or sympathy, the men will enter upon a second winter with very different feelings from those which will prevail if they know that they are not forgotten. The moral effect of sending a vessel to communicate will thus be incalculable. Captain Haswell attaches much importance to this consideration, and, having had upwards of four years of experience in the ice, he can speak with authority.

The Admiralty Instructions, though they leave the question of communication in 1876 open, and do not refer to it, contain orders that every available opportunity is to be used to communicate proceedings (para. 30). With excellent judgment and wise foresight, Captain Nares has provided for communication, the urgent necessity for which must, of course, be clear to him. The arrangements are that a party from the 'Discovery' will be at Littleton Island or Cape Isabella about the 1st of May, 1876. A boat will also be sent to the entrance of Smith Sound later in the summer, unless the season is very open, when the vessel coming out in 1876, might go up as far as Cape Sabine, or even as Cape Prescott. The spring journey will be performed by dogs, and will not perceptibly weaken the exploring parties. The distance from the 'Discovery's' winter-quarters will be about 250 miles. In 1853 Mr. Roche, with dogs and one other man, went over 300 miles in fourteen days. In 1854 Captain R. V. Hamilton, with dogs, went over 240 miles in eight days, at a rate of 30 miles a day.

It is simply impossible, in the face of these arrangements, that no vessel should be sent, in 1876, to meet the parties arriving at the entrance of Smith Sound in the spring and autumn. Imagine those weary men reaching Littleton Island, possibly in urgent need of succour, and finding no sign of any care for, or thought of them. If, as we all hope and trust, everything has gone well, it will have been none the less incumbent to have taken the precautions that prudence and experience dictate. Under any circumstances the despatch vessel will have performed the important service of bringing home intelligence which all England, indeed the whole civilized world will welcome.

All that is required from home is that a properly fortified and provisioned steamer should be sent to the entrance of Smith Sound in the navigable season of 1876, to visit Littleton Island and Cape Isabella. The vessel that is to go in 1877 might also go in 1876, and be commissioned for the purpose. The expense would be inconsiderable, as the same vessel, much of the stores and provisions of 1876, will be available and required in 1877. This was the course adopted in 1853 and 1854. Or a whaler might be hired to perform this important work, and proceed to the entrance of Smith Sound. A third plan is to request Captain Allen Young, who will sail in the 'Pandora' next May, to turn aside from the object of his voyage to do the great public service of communicating with the Arctic Expedition.

These three plans were submitted for the consideration of the Admiralty, in the end of November, when the mode of communicating in 1876 had not been decided upon. The above arguments were earnestly urged upon the attention of their Lordships at the same time. The question, although raising a point which had been previously disposed of adversely, was favourably considered, and a decision has been arrived at which will give universal satisfaction throughout the country. Captain Allen Young has, with great public spirit, agreed to perform the important duty, the urgency of which can scarcely be doubted by anyone who has read the foregoing reasons for its being undertaken. The 'Pandora' will sail next May, and Captain Allen Young will take with him the heartfelt gratitude of the relations of our absent explorers, and the cordial good wishes of all his countrymen.

THE ARCTIC MAIL FROM THE CARY ISLANDS.

July 26th, 1875.

A message, well-nigh from the utmost verge
  Of the vast frozen desert unexplored,
Borne swiftly home along the swelling surge,
  Greets us: All well on board.

Last voice to echo from the ice-fields drear
  Where all perforce is silence for so long,
O linger on the sense of those who hear,
  Like some beloved song.

Leave us unvext with fears and free to spend
  Our fancies on the trackless shore and lone,
Whose white inhospitable splendours trend
  Away to the Unknown.

The glacier feeds no foaming torrent there,
  Endures no pale-hued flower beside its way,
But rolls between stern headlands dark and bare
  To join an ice-locked bay.

On the broad plateau widening far inland,
  To watch the voiceless sea that spreads below,
A thousand winters with unwearied hand
  Built yonder domes of snow.

So show'd those stately sepulchres of old,
  Encased in glittering marble, pure of stain,
As lotos-blossoms when they first unfold
  On the Egyptian plain.

And from the open sound, upon the coasts
  The shock of icebergs shattering as they pass
Rings clear, as when with fierce acclaim Greek hosts
  Smote on the shields of brass.

Each berg on the wild waters hurrying by
  Seeks the great pack; around its crystal sides
The blue waves curl, as when some argosy
  Proudly on ocean rides.

What dream fastastic shaped them as they range
  In wondrous forms, deep-arched or donjon tower'd,
Barbaric-domed, or wreathed in spiral strange,
  Or like a palm-grove bower'd?

Who counts their squadrons? And for what delight
  Melts down the peaks the deepening sapphire shade,
Which on his panes with mystic story bright
  The ancient painter laid?

Here, sole of human race, the Eskimo,
  The sallow hunter, steals to seek his prey,
Seal-furs and oil, along the drifting floe,
  Through the long Arctic day.

Once in the waste, Venetian wanderers told,
  Arose from dark-robed choirs the Latin hymn,
Through the keen air the Angelus chimed, and roll'd
  The last sad requiem.*

But all is silent now; the boiling wells
  Foster no kindlier growth in flower or grain;
No matin chant from the rude ruin'd cells
  Shall ever mount again.

Scant memories haunt these lands where life ebbs low,
  Yet this is sweet to us of later time,
Us restless-hearted, whom the thirst to know
  Lures to this cheerless clime.

Shall it be ours, the secret that we seek
  Through earth's extremest rigours, with the long
Patience that conquers still, though man be weak,
  And Nature giant-strong?

Though the red tremulous streamers flame and fade
  Over lost ships, and starved men sunk to rest,
Where even death corrupts not, undismay'd
  We cleave unto the quest.

For honour's sake we might not lightly yield,
  While held in fee of that relentless soil,
Like a king's gauntlet flung upon the field,
  Lay such heroic spoil.

Now the last doubt is solved, and Franklin's name
  Rests with the deathless, none may fill the page
Virgin on Arctic charts, but we who claim
  Our old proud heritage.

So, brave hearts far away, we greet you well:
  Touching through happier seas the central goal,
Or foiled anew before such ramparts fell
  As screen that Southern Pole,

Where earth has shaped the circles of the lost
  Which Dante's fleshly eyes ne'er saw, and higher,
Beyond the ice-cliffs of eternal frost
  Smoulders the eternal fire. †

Alike we hold you worthy; for the fates
  Are kind or cruel, but the stedfast soul
That can endure and dare, a victory waits
  They crown not nor control.

MARY FRANCES CLIFTON.

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* The Venetian Zeno, in the 14th century, describes a monastic colony in Greenland. The cells of the monks were heated from a natural spring of hot water, by means of which were also warmed covered gardens, so that they could rear fruits and herbs. These were doubtless the hot springs of Ounartok, near which some remains of buildings are still to be seen.

† Sir James Ross found that all approach to the South Pole was barred by an impenetrable wall of ice, extending hundreds of miles in length; beyond this barrier rose the great volcano, which he named Mount Erebus, to a height of 12,000 feet above the level of the sea.

THE SWEDISH ARCTIC EXPEDITION.

PROFESSOR NORDENSKIOLD has furnished in a letter to Herr Dickson, promoter of the expedition, further particulars* of the progress of himself and party up the Yenisei River in Northern Siberia. The anchoring place of the 'Pröven' at the mouth of the river was left on the 19th of August, and the Professor, accompanied by Drs. Lundström and Stuxberg and three fishermen, proceeded up stream in a boat built expressly for the purpose. The numerous stores, equipment and provisions for six weeks, helped most seriously to weigh down the boat, but fortunately the weather proved calm. The course lay at first inside a number of low, barren, rocky islets, between which there was occasionally space and depth enough for large vessels to anchor. Jefremoff Kamen, the first landing-place, was almost entirely destitute of vegetation. Krestowskoy, the next landing-place, is now deserted, but was formerly inhabited all the year round. The houses had flat turf-covered roofs, and good accommodation in the shape of dwelling-rooms, bake-houses, bath-rooms and store-rooms. The travellers were subsequently informed in Dudinka that this settlement was abandoned by the inhabitants some considerable time ago. The vegetation in the neighbourhood is very luxurious, and Professor Nordenskiold thinks that the increased navigation of the Yenisei will lead to the place being repopulated.

The right bank of the Yenisei always affords a good channel for navigation. South of Jefremoff Kamen there are lofty sandbanks slanting into the water on this side. The vegetation was very scanty here; but further on, at Cape Schaitanskoi, some ripe cloudberries were gathered. At the confluence of the Sopotchnaya Korga, or Boot River, the party anchored. There are some abandoned houses here, but the place is not unfrequently visited by hunters and fishermen; numerous snares and traps were seen, and foxes evidently abound. The large quantities of heaped up driftwood, broken branches, and roots, which had been met with the whole way from the mouth of the Yenisei, here increased so as to compel very slow progress. The most northerly inhabited place is Goltchika, but the expedition was prevented by rough weather from landing, until they approached the River Mesenkin, which is on the opposite (*i.e.* western) side. Its valley is more sheltered from the icy north winds than the low bay near Sopotchnaya, and is very rich in vegetation, the shrub elder *(Alnus fructicosa)* being common. Some large pieces of brown and ordinary coal were here met with, and some interesting geological observations were made by the Professor. A Cossack, employed in the fishing-station of Goltchika, was here hired as guide as far as Dudinka for the sum of fifty silver rubles. The natives, who are chiefly Samoyedes, Dolgans, and Yakuts, have much decreased in numbers during recent years, owing to an epidemic which broke out among the Samoyedes. At Cape Gostinoy (71° N. lat.) the first snow met with in the journey up the Yenisei was seen in a ravine. The shore was lined with bushes, among which were the Arctic raspberry *(Rubus arcticus)* angelica, cortusa, &c. The river all along here abounds in fish, and the trade of preserving it is carried on during part of the year. At Nikandrofska a great many dogs, apparently of the same breed as the Greenland ones, are kept to draw boats in summer, and for driving in winter; reindeer not being used for such work. At Tolstoi Nos, a well-built village, the people showed great interest in the expedition. There is here a monument erected in memory of some political convicts hanged close by. Twenty-six hours' journey to the south brought them to Saostrofskoy, where the party embarked on a steamer belonging to a merchant named Yarmenieff, who received them very cordially. Although still north of the Arctic circle, the vegetation, particularly on the islets, which in spring are submerged, was most luxuriant and beautiful. One of the party, a farmer-fisherman, was continually expressing feelings of envy that the Russians should own so fair a country, where there was no one to cut the grass. This was especially the case when the splendid woods and rich black soil between Yeniseisk and Turuchansk were reached, an almost uninhabited region, which for fertility may be compared with some of the best parts of Sweden, and is of greater extent than the whole Scandinavian peninsula. Some of the finest timber woods on the globe are here to be found, and southward are tracts of the most fertile soil waiting for the plough. At Tomsk, where Professor Nordenskiold dates his letter, magnificent grapes are reared. Three Russian expeditions have been sent during last summer to report on the river communication of Siberia, and the Professor was informed, unofficially, that the opinion of the officers was that for 700,000 rubles the Upper Angara might be made navigable as far as Lake Baikal, and that inter-communication by water might be established between the Obi, Yenisei and Lena systems.

Our readers will find an account of the reception afforded to Herr Nordenskiold and his party by the members of the Imperial Russian Geographical Society at page 28 of our present number. The best map on which to follow the progress of the expedition up the Yenisei, is that by Herr Schmidt in volume xviii. of the *Memoires de l'Academie des Sciences de St. Petersbourg*. The information derived from this map was incorporated, as far as possible, in a small scale map of the Siberian Polar Sea in the *Ocean Highways* for February, 1873.

The *Goloss* notices the various expeditions which have endeavoured during the present century to establish communication by sea between Northern Europe and the great fluvial highways of Siberia. The first was undertaken at the instance of the Minister of Commerce, Count Rumantsief, who himself made several exploring trips, with the object of uniting by a canal the estuary of the Obi with the Bay of Kara, and so avoiding the necessity of making a way through the ice-encumbered straits to the north. One of the chief obstacles to this project lay in the fact that the continuation of the Ural range here intervenes, and is between 400 and 500 feet above the level of the sea.

The second expedition was organized in 1832 by M. Klokof, a man of ability, who held the post of Superintendent of the Northern Forests. He equipped a schooner and entrusted the command to Lieutenant Krotof, with instructions that he should start from Archangel, make for the eastern coast of Novaya Zemlya, and from thence for the Yenisei.

*See November number, p. 352.

The expedition started in 1832, but their subsequent history has remained a mystery, for although the wreck of the schooner was found two years later, nothing is to this day known of the fate of the crew.

The last attempt before Nordenskiold's, with the exception of Captain Wiggins' journey last year, was in 1862, when Lieutenant Krusenstern embarked in a schooner, at the mouth of the Petchora, with the object of reaching the Yenisei. He succeeded in passing through Pet Straits (Yugorsky Shar), but was hemmed in by ice, and compelled on the 9th of September to abandon his vessel in 69° 57′ N. latitude, and 66° 2′ E. longitude, and return to Petchora by Obdorsk.

In speaking of the probable commercial results of Professor Nordenskiold's voyage, the *Goloss* points out that he was born in Finland, educated at Helsingfors, and only left that country in 1858, so that Russia may justly derive additional satisfaction at the success of his present enterprise.

THE MALAYAN PENINSULA.

IN all ages there has been the alternation between the geography which, as it were, creates history, and the history which creates geography. Thus, in China and India, of recent years, or within the experience of the living generation, vast additions to the popular knowledge have been made by wars, the mutiny, the famine, and now by the visit of the Heir Apparent. Some light, too, has been cast upon the comparatively obscure regions of the Eastern Archipelago by a succession of events dating from Sir James Brooke's experiment at Sarawak, on the coast of Borneo, and the latest of these has attracted attention to the shores and interior of the great Malayan Peninsula, a country lying far remote from the ordinary knowledge of Europe, and yet one the annals and natural circumstances of which abound with interest. Its native chronicles extend through centuries before the arrival of the first Europeans in those waters; while its traditions point to nations and empires that have past away.

As one of the two gateways commanding the seas of the Further East, the Straits of Malacca are of the highest importance to navigation and commerce; nor will this be diminished in any considerable degree, even should the long-meditated project be carried out of forming a new passage between the Indian and Chinese Oceans across the Isthmus of Kraw, contiguous to Lower Siam, a neck of land less than 100 miles in breadth, with navigable rivers running to a considerable distance through the territory on either side. The inhabitants, indeed, declare that in traversing this district they are only compelled to carry their burdens a journey of six hours overland. This is more than probable; but, to the present day, very little is known of the valleys among those hills that, branching from the great mountain chain of India, throw a ridge across Aracan and Pegu, and down the entire length—nearly 500 miles—of the Peninsula, reappearing in Sumatra, as far as the Islands of Banca and Billiton, where it may be said to disappear. As it approaches the equator, this vast range diminishes in height, from 6000 feet above Quedah, to less than half that altitude in the provinces of Rumbowe and Johore. Mount Ophir, a detached peak, 40 or 50 miles east of Malacca is exceedingly lofty. From the central backbone the land undulates in opposite directions to the sea, and large tracts, covered with dense forests, have never been explored. Nevertheless travellers have, from time to time, penetrated the savage woodland, to the grassy plains by which it is varied, finding everywhere a most extraordinary wealth of vegetation, generally rank; for there is an equally remarkable prevalence of water, in the form of lakes, springs, rivulets and rills without number coursing down the shaded slopes, until they unite in large streams forcing their way into the China Sea on the east, and, on the west, into the Straits of Malacca and the Indian Ocean. Their currents are sluggish, as they approach a level, and their swampy banks are huge entanglements of nipah, nibong, and mangrove trees; the two former being palmites of priceless value to the people. With their rough, straight, and elastic stems are formed the corner posts and flooring of the native habitations; their leaves supply the thatch; their sapling growths are made into bows and spears; their juice is a sweet and wholesome drink, and the leaf-like sheaths of their fruit are the water-pitchers of a thousand primitive villages. For, while the maritime borders are occupied by an inconceivable variety of settlers—the roving Bugis, or Gipsies of the Sea, the predatory Samsams, the industrious Siamese, and the dominant Malay—pursuing their various vocations of agriculture, trade, fishing, and now and then a little piracy, though this last, broadly speaking, is the vice of the Malays, who have few rivals in it, except, perhaps, in those curious ichthyophagi, the Rayet Laut, or Subjects of the Sea, who hate them, though employing their language and, in some instances, adopting their religion. These singular people have no fixed homes, and yet are not exclusively maritime; for they erect temporary villages on the coasts, which they desert at the close of the pearl or fishing season, at that spot, when they construct new boats and set out upon their commercial voyages—about the beginning of March, when the east wind—the Pirate's Wind, it is called—begins to blow, and these brigands of the water make prey of whatever traders they can overwhelm, until at the turn of the monsoon, in November or December, they re-assemble at their haunts, beach their boats under shelters of thatch, and enjoy a spell of cock-fighting and opium-smoking until the inclination to be industrious revives. It is certain, though difficult of proof, that some of the petty princes of the Peninsula, with whom England has relations more or less definite, are associated with this system, and derive no inconsiderable revenues from it. Far otherwise is it with the dwellers inland, once reputed to be cannibals, who, divided into numerous tribes, subsist chiefly on the flesh of wild animals, wild grapes, and fruit, generally barbarous and superstitious, having their abodes in rude little huts, raised high in the air on pillars of palm, very much in awe of their buried ancestors, and with an infantile dread of thunder and lightning. They kill the elephant for his tusks and his feet, the wild hog for his flesh and bristles, the buffalo, bison, and pigmy deer for their hides, horns, and meat, and the royal and the black tigers for their

skins, while the mermaid, so named on account of its fancied resemblance to a woman, is a dainty served up only to rajahs and kings. So, at any rate, runs the story of the Malayan Seas.

With respect to the interests of Europe in the Malayan Peninsula, it has long been notorious that its rich tin mines are the objects of an extreme jealousy on the part of England, Holland, and the native chiefs. They are exceedingly prolific, and the ore is exceptionally pure—purer than that of Banca, which sends forth nearly a thousand tons annually to China, Hindustan, and the West. The product of gold is not extensive, while that of silver is nominal; but both coal and iron have been ascertained to exist, though these two resources are altogether neglected. It is, however, the commerce and navigation of the Straits that give their greatest importance to these coasts and waters; though spices and gums, dyes and cotton, sugar, sago, rice and tobacco are yielded in profusion on the cultivated grounds, and furnish cargoes to many a quaint flotilla. Ornamental woods are common, with salt, wax, and fruit, great materials of traffic in those seas; and while the complaint is so rife that fashion is exterminating all our pretty birds for the sake of making aigrettes of their plumage for the heads of ladies, it may be wondered at why no speculator brings home a million or two of the feathered things that outshine the sun in those radiant regions—golden, blue, red, purple, irridescent creatures that fall a prey in countless numbers to the snakes.

The political constitution of the Peninsula has been partially modified within the last ten years or less, principally owing to an extension of British influence, never very palatable to the Dutch, and always obnoxious to some, at least, of the native princes. The region, from an early period, has been divided into numerous states, some independent, others combined in a kind of federal alliance, and a few dependent on the neighbouring power of Siam. On the western coast are Quedah, Perak, Salangore, Malacca, and Johore, extending in order from north to south, the last-named being no more than the decaying remnant of a sovereignty that once represented no insignificant degree of authority and wealth. On the east, Johore is joined to Pahang, which is followed by Kemanan, Zingaun, Kalantan, and Patani. These are all maritime territories. In the interior are Jellalu in the north, the first link of a chain extending southward through Janbole, Sungre, Ujong, Srimenanti, Rumbowe, Johole, Jehlye, and Seganet, which is contiguous to Johore, at the extremity of the Peninsula—an uncouth array of names, yet one which might be worth remembering in the event of any hostile Malay confederacy arising out of recent complications.

In 1867 modifications took place, but left the tropical line of states thus extending along the whole length of the Peninsula practically intact, though the establishment of a Residency, or in fact, an imperial *veto*, on a more formal scale, was viewed with apprehension and dislike at more than one of the petty native courts. With Johore, however, fell the last of those dominions on the Peninsula, Malacca excepted, that were ever at any time capable of long resisting the influence of Europe, or rivalling the Empire of Mataram in Java, or the States of Achin and Menangcabao in Sumatra. The first and second of these are virtually extinct, though the one formerly extended its sway from coast to coast almost of the richest island in the world, while the other, founded at an unknown date, supposed to be coeval with the original arrival of Malays in the Archipelago, utterly perished, after 1100 years of an ascertained history—history ascertained, that is to say, so far as it may be by monumental relics; and Achin, though it has exhibited an astonishing vitality of late, is no more than the shadow of its former self, when its fleets literally swarmed along the Straits, and did not shrink from encountering the armed vessels of the Dutch East India Company, with their military crews, and panoply of gun-metal. This ancient enemy of Malacca carried on a three months' siege against the Portuguese garrison of that city, and left thousands of their dead beneath the walls. It ranked then indeed among the most formidable powers of the remote East. The most distant countries of Asia sought its alliance. A liberal commercial policy had crowded its port with a rich and increasing trade. Vessels from Mecca on the west, and Japan on the east, came with the products of their soil for sale or barter. The feudal lords possessed fortified castles of their own, and kept the population in awe by displays of retainers bristling with weapons. The Malay colony of Malacca, on the Peninsula, also grew into similar, though not equal, proportion; and Singhapura, founded A.D. 1160, on the main—not the island with which its name suggests a relation—owed its origin to the enterprise and energy of a few emigrants from the opposite shores. They chose a site on the north-east end of the Peninsula, the best for commerce and the worst for agriculture. There at once, like the men of Scripture, they commenced the building of a city which should command the western entrance of the Archipelago, and their reasons were precisely the same as those which, nearly 700 years later, guided the policy of Sir Stamford Raffles. It was through this avenue that the earliest adventurers from Europe, after Marco Polo, made their way into the Archipelago in 1506, when a vessel from the Tagus, bearing Alonzo Talesso—that great and yet little heard-of navigator—first sailed among the Indian islands and made the discovery of Sumatra. Two years later, Sequieria reached Malacca itself, then a flourishing city, with a large and rich population, and a Sultan whose palace possessed considerable grandeur. Then opened to the imagination of the renowned Viceroy of Portugal, Albuquerque, his memorable vision of the East, which, glowing though it was, scarcely compassed the reality, and then began the wars of the west in the Archipelago. The Malayan city withstood a triple attack, though destitute of walls and ditches, and defended only by detached wooden towers.

From that time forth peace can never be said to have reigned in all that region of wealth and beauty, where, as Marsden, the most sober of travellers, says, "the vegetation is something fearful." In those days Asia was the magnet which attracted that spirit of discovery which has since turned towards the African and Polar wildernesses. Not, however, that the field is in any sense exhausted. It is not even settled, as yet, what are the true geographical limits of the mighty group familiarly termed the Indian Archipelago, or whether

it can be said to include New Guinea, and not to include Ceylon. Yet the ancient Taprobane, as it is still believed by some to be, would appear to have more affinity with the islands than with the continent. Thus, it will nourish the nutmeg, though Professor Oxley fixes on the Straits as the utmost limit, westward, of this cultivation, which Hindustan has always refused to do, while in our own territories, the cinnamon has been transplanted from Ceylon. Here is a portion of the world's surface, whether a shattered or a growing continent, though probably neither, covering an area of 8000 miles, including at least twenty countries of great size—one nearly equalling Europe in extent—which, beginning where the Bay of Bengal ceases, runs with thirty-one degrees of latitude breadth through fifty of longitude into the Pacific; and of this the Straits of Malacca simply form the approach. To say that it has been explored would be altogether to mislead. Little is known, to this day, of Sumatra, still less of Borneo, and scarcely anything of many among the inferior islands. As for the Peninsula itself, the curiosity of very few travellers has been tempted by its barbarous, though picturesque, interior. Nevertheless, its coast has been the scene of continued struggles between the stranger and the native, or Malay population, which has an instinct for the neighbourhood of the sea.

Sequieira and Albuquerque, it has already been noticed, led the van, conquered Malacca, and shook all the contiguous states. Within a period of ten years, the Portuguese, in their turn, were twice assailed in their citadels, and yet, a short while later, were encountered and signally defeated in the very heart of their position. The armies of Pahang and Johore simultaneously beseiged their garrison, reducing it to the last degree of distress; but the natural superiority of the European prevailed, and 6000 Malays paid with their lives the penalty of an attempt to restore the independence of their country. The Achinese again carried on an intermittent series of hostilities against the western settlement, and the effusion of blood was prodigious. But the Dutch were now contesting the commerce of those waters, though they entered through the Straits of Sunda, the second western outlet of the Archipelago, and immemorially a great highway of its trade. They cast their eyes at once, and jealously too, upon the prospering town of Malacca, to which, indeed, they allowed no rest until they had become its masters. Unlike their predecessors, they held their acquisition with a firm hand, easily repulsing any of the rajahs who sought to molest them, notwithstanding that their dominion in the other islands was incessantly menaced.

It was not until towards the close of the 18th century that England established a foothold in the Archipelago, by a cession from Quedah, or Keddah as it is called on the old maps, of the island of Penang, or Prince of Wales Island, lying off the west of the Peninsula—a prototype of Labuan, being a speck upon the sea, 15 miles long and 12 miles wide at the utmost, but valuable as a *pied-a-terre* in the north-west of that richly-studded sea. This was in 1783. In 1795, the English compelled the surrender of Malacca by the Dutch, and of Perak by its Rajah, who and whose descendants, however, were permitted to retain their honorary regal rank. Thither soon crowded the merchants of Java and the Moluccas, of Celebes and Borneo, of Papua, Cochin-China, and the Celestial Empire, and it was considered that a treaty with Perak would be preferable to its absolute annexation. Raffles was of this opinion. He required, he said, neither territories nor population. All he wished for was permission "to anchor a British line-of-battle ship, with the British flag flying, at the mouth of the Straits of Sunda or Malacca;" but he saw reason, before long, to alter this view, and this change led to the fortunate occupation of Singapore, off the head of the Peninsula, at the south-eastern entrance of the Straits, about 80 miles from the equator, six days' sail from China, separated from the main by only a narrow channel, and surrounded by nearly fifty islets lying within its political jurisdiction. Rhio was originally proposed; but the Dutch took possession of it themselves. The Carimon Islands were next visited: they command the main avenues of the Straits, are good in a military point of view, contain rich mines of tin and a soil of superior fertility, with important advantages of climate, shelter, and anchorage; yet they were rejected, and Johore, the ancient metropolis of the Malay Empire, on the Peninsula, was also happily passed by. Singapore was then fixed upon, and negotiations were commenced immediately. Nearly 100 years previously, the Sultan of Johore had granted the island to an English traveller, who at once appreciated its commercial value, but rejected the gift as useless to a private individual. The English, at the outset, only agreed for permission to build a fort and factory, and to occupy a territory on the north shore, 2 miles in length, and as wide as a cannon's range—a cannon's range in 1810. The history of the affair closely resembled, up to a certain point, that of our relations with Perak, the little state at present troubling us. The last lineal prince of Johore died in 1810, when, no heir succeeding, his first Minister took Pahangan on the east, and held it as rajah, while his chief judge took the western side, with the adjacent islands—Singapore among them. Two bastards of the late ruler, however, rose to contend for the decayed throne of Johore. The Dutch took part with one, the English with the other; the English candidate was successful, and from him the cession was obtained by a direct payment of money, and the guarantee of a pension. At that time 150 fishermen inhabited the island; by that time next year, there were 5000 inhabitants; ten years later 10,000. In vain did the Dutch remonstrate against what they termed an encroachment upon their sovereignty among the islands; their rivals regained Malacca, and, with it, Naning, an inland territory of the Peninsula, some 40 miles in length by 10 in breadth, of which no proper use was ever made. We have seen the growth of the insular community of Singapore, Malacca, and of Penang, three model settlements, and worthy to represent England in that brilliant quarter of the globe. That they should be held in security and peace is, slight though their territorial dimensions may be, no unimportant interest of the Empire.

HORACE ST. JOHN.

ON FORMER PHYSICAL ASPECTS OF THE CASPIAN.

AMONG the questions of interest resulting from the rupture of the Bosphorus, and the consequent separation of the Aral, Caspian, and Euxine basins, the enquiry as to the aspects possessed by Lake Aral in past historical times, has afforded a wide field for speculation. From the more varied and complete information we have regarding the Caspian, this sea seems generally to have been considered as presenting a less interesting problem; though some considerations will be submitted in the following note, which seem to point to the conclusion that this basin, no less than that of Aral, has undergone variations of aspect which, as far as I am aware, have been unsuspected, but which are most startling.

It is evident indeed that the quantity of water contributed by so large a river as the Volga must have a very great effect in preserving the area of this enclosed sea; which depends for the stability of its level on the sole condition that the supply of its tributary rivers shall meet the evaporation which takes place from its surface. Measurements of the Volga discharge must doubtless exist, though their records are difficult to find; and the only one I have met with is that made by Captain John Perry, an Englishman, who was employed, in the year 1700, on the works intended to connect the Don with the Volga. The project in question was very soon abandoned, though it has been reconsidered on several occasions subsequently, and has indeed been discussed recently, in a paper submitted by Colonel Veniukoff to the Imperial Russian Geographical Society. Dr. Bergstrasser has stated that General Belancourt declared against such a work, and preferred a railway. As this opinion seems to have been emitted in 1802, the circumstance shows that the officer named was somewhat in advance of the ideas of his times.

Perry's measurements give a minimum low water discharge of about 8500 cubic yards per second to the Volga; and he says that one-sixth more should be added for the mean annual stream, which would therefore amount to 10,000 cubic yards per second. Under these conditions, the maximum volume during a flood in spring, on the melting of the snows, might probably be as much as 20,000 cubic yards per second, or about one half of the flood discharge of the Mississippi.

Colonel Veniukoff has estimated the annual rate of evaporation from the surface of the Black Sea to be just one yard per annum; though M. Elisée Reclus considers this to be below the truth. The rate in the Aral basin can be more easily calculated, since it is supplied by two rivers only, whose volumes are now known with sufficient correctness. A consideration of the discharges of the Amú and of the Syr points to the conclusion that the rate of evaporation in this basin, is not very incorrectly stated at one yard per annum; and it therefore results that this figure will approximately represent the rate of the Caspian basin, which, to say the least of it, is not exposed to a drier atmosphere.

Since the Caspian water surface has an area of 140,000 square miles, the annual loss by evaporation would amount to 14,000 cubic yards per second nearly, and deducting 10,000 from these for the supply of the Volga, there remain four thousand cubic yards for the other rivers now tributary to this basin, conjointly with the rainfall. The Volga is thus seen to contribute about five-sevenths of all the water received by the Caspian Sea to meet the evaporation taking place from its surface. Any diminution of the volume of this great river would therefore have an immediate and marked effect on the area of the sea; while a diversion of its entire stream (into the Sea of Azof for instance) would reduce the present water spread of the Caspian to two small lakes, more or less surrounded by marshes. The greater of these lakes would be enclosed approximately by the line of soundings, along the depth of 1200 feet, and would be situated to the south of the parallel of latitude which passes nearly through Bakû and Krasnovodsk. The second lake would be of smaller dimensions still, and situated to the north of the first. It would, however, be fringed on its north by extensive marshes, formed by the waters of the Ural and Terek, as well as of other rivers which now feed the Lower Volga, and by such overflow as might take place from time to time, from the north-west of the upper basin of the Aral. And, as will be presently seen, it would receive in all probability (were former aspects of the *Palus Mœotis* restored) an overflow from the west by the channel of the Manytch. Such a desiccation of the Caspian basin would be the necessary consequence of a flow of the stream of the Volga into the Sea of Azof; and such physical aspects may be said to answer to the vague and general descriptions of the localities which have been handed down to us by ancient historians and geographers.

Not much stress can, perhaps, be laid on the affirmations of the ancients, that the Caspian contained numerous serpents of large size. It is, however, not out of place to note that after the rupture of the Bosphorus, and the consequent draining off of the fresh water Asiatic Mediterranean, the fauna of this sea would have been trapped, as it were in numbers, in the small lakes, surrounded by marshes, to which the basin of the Caspian was probably reduced, and the existence of these reptiles would thus have been more easily noted. Passing on to Strabo (B xii. c. 7.), we are told that it is only near Hyrcania, that "the Caspian properly becomes a sea, an aspect which it preserves to the foot of the mountains of Media and Armenia. For these mountains, which at their bases are curved in the shape of a crescent, terminate as it were on the seashore, and really form the bottom or background of the Caspian Gulf." As to the northern portion of the Caspian, Pliny (B. ii. c. 67) tells us, that "the greater part was explored by row boats during the reigns of Antiochus and Seleucus;" and Quintus Curtus (B vi. c. 4) describes the northern part of the Caspian basin as follows:—"On the north this sea covers a vast extent of shore: it rolls its waves afar, and leaves stagnant a great part of the waters, which it draws with it in its flow. But if the aspects of the heavens change, it is seen to recede within its limits, and drawing back its waters as impetuously as it formerly carried them forward, it leaves to the country its former appearance. Some geographers have thought it is not the Hyrcanian Sea, but that of India which bathes the country of Hyrcania." In this description we have the information that the boundaries of the northern part of

the Caspian were extensive marshes, and a doubt is also suggested whether this northern part of the basin was not entirely distinct from the southern part, *i.e.*, from the Hyrcanian Sea, where the Caspian "properly becomes a sea." It can scarcely indeed but be admitted that the three passages quoted, indicate very significantly that the basin formerly possessed the physical aspects which have been specified. What the actual level of the Caspian may have been it will of course be impossible ever to ascertain, except in a general way. But it may be worth while to examine such evidence as refers to the low level which the Caspian is indicated as possessing, by the vague statements which have been glanced at above.

It is a characteristic trait of Peter the Great, that when he visited Bakû, in 1724, his attention was immediately arrested by the appearance of an ancient *caravanserai*, whose ruins were situated at a depth of some fifty feet below the surface of the Caspian Sea. Engaged as he had been on the design of connecting the Don with the Volga, and in considering the results which might follow the execution of so original a project, his mind at once grasped the bearing of the situation of these ruins, on the question of the stability of the Caspian level. He consequently gave orders for fixing a permanent bench-mark at Bakû; a circumstance of which Humboldt seems to have been ignorant, since it is mentioned in his *Asie Centrale* that he himself made a suggestion to the same effect, about a century subsequently. In any case, oscillations of the Caspian level have been established by actual observation since the 18th century, and some account of them was submitted by Lenz to the Academy of Sciences of St. Petersburg in 1833. The son of this *savant* gives a short *résumé* of such oscillations in the memoir *Unsere Kenntnisse über aen früheren Lauf des Amu-daria* (von Dr. R. Lenz, St. Pétersbourg, 1870), from which the following figures are extracted:—

	Feet.
Level of the Caspian before the founding of Bakû...	−50
" " at commencement of 15th century	+15
" " " 18th "	+ 0
" " from 1727 to 1780	+10
" " from 1820	+ 7
" " from 1830	+ 0

since which last date, it is believed the surface of the sea has been stationary. It is not stated how the difference of 15 feet between the levels of the 15th and 18th centuries was observed; but Dr. Lenz remarks that such a fall agrees well with the change of flow of the Amú-darya from the Caspian to the Aral basin, which undoubtedly took place between these epochs. There would also seem to be no known reason for the rise of the level of the Caspian in the middle fifty years of the 18th century. But besides the local observation at Bakû, a number of circumstances indicate in a general way that the level of the Caspian Sea actually did rise in the manner recorded.

Pallas (vol. ii. p. 315) states that in 1556 the Russians first navigated the Caspian, and found 5 feet only of water, at 9 leagues south and south-east of the islands of Tschetiné Bogorié, which is situated near the west coast, in about lat. 45° 40'. In 1722 Peter the Great found 6 feet at the same place, while towards the end of the 18th century the depth had increased to 12 feet. At the beginning of the same century there was a large area of dry, cultivated land near Lenkoran; and later on in the century this land was covered with water, through which the ruins of houses could be seen. Near Astrabad, in 1743, water deeply covered land which was crossed dry-shod fifty years before, and a similar circumstance was related to Woodroffe in Balkhân Bay (*vide* Hanway's historical account of the Caspian). In 1730 the country about Gorlieff and the mouth of the Ural River was 6 feet above the Caspian level; but after the spring of that year the sea rose, and the islands situated at the outlet of the Ural disappeared. Count Gamba (vol. ii. p. 309, *Voyage dans la Russie meridionale*) records at the end of the last century that travellers formerly went along the west coast of the Caspian, between Lenkoran and Siljan, by a road which was covered with water at the date he was writing. There is then the certainty that the level of the sea fluctuated by at least 10 feet in the space of about half a century, for no apparent reason whatever, since no portion of the volume of the Volga was diverted from its usual outlet in another direction. Both the rise and the fall of the water-surface seem therefore respectively due to a series of successive years of flood and drought; and such a circumstance may assist us in realising the enormous difference in physical aspect which the Caspian basin would present were the whole volume of the Volga transferred to an outlet in the Sea of Azof.

Vague as they may be, there are physical indications which point to the low level possessed by the Caspian in ancient historical times. Besides the ruins at Bakû, a city which tradition affirms to have been founded by Alexander the Great, there are other antique remains on the Caspian shore, which were constructed at a date when the surface of the sea had less area, and consequently less depth than now. In Mr. Delmar Morgan's *résumé* of Stebnitzky's Report on Turcomania (*Journal R. G. S.*, vol. xliv., p. 223) the wall of Kizil-alan is described to commence near the sources of the river Görjen, and to run parallel to this stream along a distance of 100 miles. "At present this work presents the appearance of a ridge of hillocks, 5 to 7 feet high and 6 fathoms thick. It is evidently built of burnt bricks, and there are remains of square redoubts (situated) at different parts of the wall, and at 150 paces on one side of it. Eastern writers attribute its construction to Alexander of Macedon, as a protection against the attacks of the northern tribes. According to Baron Bode, Kizyl-alan is mentioned by Arab writers, under the name of Seddi-yadjudj-o-madjudj, and is the Gog and Magog of Scripture." Just as the Great Wall of China was built to keep out the Mongol hordes, so Kizyl-alan was built to prevent the incursions of those Asiatic scyths who, as Strabo tells us (B. xi. c. 8), "from the most remote times invaded at their pleasure Hyrcania or Nesea or the plains of Parthia." The extremities of this barrier would necessarily have rested on some impassable obstacle, and the noticeable feature for our purpose is that its western end continues at the present time into the Caspian Sea, so that this extremity was built when the surface had a lower level than nowadays.

General Stoletoff, lately chief of the Amú-darya expedition of 1874, and formerly Colonel Commandant at Krasnovodsk, informed me of a circumstance

which undoubtedly points to the low level possessed by the Caspian at some very remote epoch. The two lakes into which the Caspian basin would be divided, in event of its ever being deprived of the Volga waters, have already been mentioned. These two lakes lie between the projecting point close to Bakû, on the west, and the neighbourhood of Krasnovodsk on the east, and along this dividing isthmus, whose lowest point is at a depth of 660 feet below the present level of the Caspian, would have been the natural communication between the opposite shores of the basin, under the conditions of desiccation we are considering. Local tradition asserts that in ancient times chariots passed across this narrow part of the basin, and the actual ruts left by the wheels in the sandstone are details not wanting to support the story. Singular as it is, it is difficult to explain what could have given rise to such a tradition, except the actual division of the Caspian into the two parts mentioned. And this tradition may perhaps illustrate an obscure passage in Arrian (B. iv. c. 15), where it is said that the territory of the Chorasmeni bordered upon Colchis and the Amazon country; and where it is recorded that the king of the Chorasmeni, who gave in his submission to Alexander when the Macedonian army was in winter quarters at Zariaspa in B.C. 328-327, proposed at the same time a combined expedition upon the countries bordering on the Euxine. Now the Arabian author Ibn-ul-Athîr, writing in the year 420 of the Muhammadan era, has a passage* as follows, "And they came to the chain of the mountains of Balkhân, where the ancient Khwarezm was situated." The king of the Chorasmeni should therefore have possessed all the local information necessary for such an expedition as he proposed to Alexander the Great, who certainly would not have looked on the east coast of the Caspian Sea for the guides and supplies which were proferred him for the expedition. If, however, there really existed in those days such a passage by land across this basin, from Krasnovodsk to Bakû as the tradition indicates, the proposition of the king of the Chorasmeni would have been a very natural one.

Under such desiccated conditions, the outlets of the rivers tributary to the Caspian basin would have presented different appearances to those of the present time. The southern shore of the sea between Enzeli near Reshd and the bay of Astrebad is exceedingly shelving, and the line of soundings at a depth of 2500 feet is found along the western portion of this shore at about 20 miles from land. This would give a slope of 125 feet per mile of horizontal distance, and rivers running down so steep a course would present the character of rapids, and probably possess regular falls of water. Now Strabo (B. xi. c. 7) has a passage which agrees curiously with such aspects. He says that the Hyrcanian Sea (which we know from many ancient authorities, but more particularly from Pomponius Mela, B. iii., c. 5, was the southern portion of the Caspian basin) "is in certain places bounded by high cliffs, which are excavated at their bases in caves, and which jut out in such a way as to leave between them and the sea a low and level shore. Now the rivers which fall into the sea from above acquire a great velocity on reaching the edge of the cliffs, and throw themselves so to speak on the shore, which remains firm to the extent of allowing a whole *corps d'armée* to pass dryshod, and sheltered by the cascade as by a vault. The inhabitants of the country often come down to this place to celebrate a banquet or a sacrifice, or simply to repose; some in the shade under the cliffs, others in the sun beneath the waterfall, each amusing himself in his own way, and enjoying at the same time the sight of an immense sea, stretching to the right and left of the spectator, as well as the nearer view of this shore, kept always green and flourishing by the humidity which reigns there."

Here then is evidence that the Caspian had fallen speedily and considerably from some previous higher level; for some of the streams tributary to its southern basin reached it by waterfalls. This condition points to the conclusion that at such a date sufficient time had not elapsed to allow of the accomplishment of the task in which all streams are continually engaged, *i.e.*, of equalising the slopes of their beds, of increasing their fall where it is small, of diminishing it where it is great. The effect of such labour reaches its fulness precisely at the mouth of a stream where the foot of the total fall from its sources has been reached, and where it discharges the whole volume of its waters. Yet in the passage quoted are recorded appearances exactly the opposite of those which are invariably and necessarily observed, where forces of nature have been continuously and uninterruptedly at work; and the inference is that in Strabo's day the Caspian was possessed of a very much lower level than it now has, and that such a low level had been suddenly attained from a previously existent condition. On the west coast of the Caspian the bed of the sea has a slope of 40 feet per mile, in lieu of that more than three times steeper which is found on the south coast. The rivers Araxes and Cyrus, on descending from the hills might, therefore, subsequently to a rapid and recent fall of the Caspian level, be expected to be lost among the deposits they would make; since in this case again sufficient time might not have elapsed for the excavation of a pronounced river bed, in which their waters might flow on to an outlet. In Strabo (B. xi. c. 4.) we find the following information:—"The Cyrus and other streams which are its tributaries, watering as they do the country of Albania, doubtless contribute to confer on it that greatest of blessings, a fertility of soil; on the other hand, these affluents have prevented it from reaching the sea. All the mud, in fact, that the Cyrus incessantly deposits at its mouth gradually fills the interval which separates several small islands from the mainland, in such a manner as eventually to unite them with it, and to form dangerous shoals along the coast, whose naturally uneven bed is made still more so by the ebbing of the waters. It is for this reason, it is said, that the Cyrus owes its division in its lower course into twelve mouths, of which some are already filled up, while others, of apparently easy access, are entirely deceitful, and have not sufficient depth to allow of a vessel anchoring in them; and this to such a degree, that along a coast of more than 60 *stadia*, which seemingly should be easily accessible, on one side from the sea, on the other by so many streams, all one portion is in reality absolutely unapproachable from the fact of the mud deposits extending 500 *stadia* into the sea, and silting up all the shore at the same time."

* *Das alte Bett des Oxus* by Professor M. J. de Goeje.

The lower course of the Kur in the Russian Admiralty chart shows two mouths in lieu of the twelve mentioned by Strabo; and the conclusion is that the river possesses at the present time in its lower courses much more power than it formerly did, and has therefore, in all probability, a shorter distance to flow before reaching its outlet. One only of the two mouths mentioned shows a bar having 4 feet of water, while the other is closed by a narrow strip of sand which would be swept away by any flood of the river, and both would thus have given access to the ships of Strabo's day in most seasons. Immediately inside the bars the water increases at once to 10 feet, and gradually to 27 feet, along a distance of 5 miles up the river. In further illustration of Strabo's description, it may be added that at some distance in a northern direction, and also at about 60 miles south-east of the mouth of the Kur, are some extensive shoals, which would have been more or less exposed with a previous low level of the Caspian. It is thus seen that such descriptions as have been handed to us, besides some actual physical evidence, point very strongly to a previous extreme low level in this basin; and it remains to be considered what evidence we have of a former flow of the Volga waters elsewhere. Should it be found that during the times we have been considering the waters of this river probably emptied into the *Palus Mœotis*, the indications of the former desiccated state of the Caspian basin will be very considerably strengthened.

HERBERT WOOD.

(To be continued.)

IS IT POSSIBLE TO UNITE THE BLACK SEA AND THE CASPIAN?

SUCH is the question which has hovered fitfully in the mind of the Russian public for years past—lapsing out of sight ever and anon, it is true, under the pressure of matters of more immediate importance, but never wholly abandoned. Ever since the summer of 1864, when the undertaking was pronounced practicable by an engineering survey sent out expressly for the purpose, the project has been, so to speak, "keeping warm," in company with the Orenburg-Tashkent Railway, the establishment of steam communication between Archangelsk and the ports of Finmark and Norway, the turning of the Oxus into its ancient channel, and other plans of the kind. In the autumn of 1871 a vigorous attempt was made by a few of its warmest scientific supporters to obtain the sanction of the Government, and have the works commenced at once; but after considerable discussion, and a furious "pro and con" battle in one or two of the leading St. Petersburg journals, the project was suffered to lapse once more.

So far as mere distance goes, however, the scheme is not so formidable as a hasty glance at the map might make it appear. The sand-banks of the Lower Don* forbidding any attempt to unite the two seas by a canal from it to the Volga, it is proposed to join the tributaries of the Manytch and the Kouma, two considerable rivers which drain the northern slope of the Caucasus, the latter running almost due east to the Caspian Sea, while the former discharges itself, after many windings, into the estuary of the Don. The total length and approximate cost of the canal are not stated, but both have been carefully estimated by the experts concerned in the two surveys; and the leading Russian daily papers, while frankly admitting the magnitude of the undertaking, have repeatedly adverted to it in far more hopeful terms than they were pleased to bestow upon the Poti-Tiflis railway or the bridge across the Dnieper. "There is no denying," says the *Moscow Gazette*, in a recent article upon the subject, "that the task will be a hard one; but it is not a whit harder than many others which have recently been accomplished; and the increase of our trade, the doubling of our naval strength in the south, and the opening of the Caspian Sea, for the first time in the history of the world, to all seafaring nations, are surely worth making any sacrifice to attain."

Undoubtedly, the great Liberal organ is so far right, that few enterprises can appear impracticable to a generation which has witnessed the accomplishment of such seeming impossibilities as the Suez Canal, the Pacific Railroad, and the Mont Cenis Tunnel; but the real merit of the enterprise, bold and ingenious as it is, lies in a fact which the *Moscow Gazette* has omitted to notice, viz., that it is the one really original conception of our plagiarist century. It is not too much to assert that all the other achievements of the age, stupendous as they are, have been virtually nothing more than a grand and successful filling in of the vague outlines bequeathed us by the past. The Suez Canal was the idea of Pharaoh-Necho; the establishing of a beaten track across the Isthmus of Panama, that of Cortez and Nuñez de Balboa; the Mont Cenis passage, that of Hannibal; the commercial highway across Central Asia, that of Alexander the Great; the diverting of the Oxus into another channel (which, however, is scarcely possible now), that of Octai Khan; the voyage eastward round the Cape, that of Xerxes; the search for the source of the Nile, that of half a dozen Egyptian kings, as well as of their conqueror Cambyses, centuries before the Christian era; the existence of great inland seas in South Africa, that of the Portuguese explorers of the 16th century, some of whom, if I mistake not, have got more than one of these new "discoveries" of ours marked on their maps! In short, we may say with the Irish schoolmaster, when he found one of his own similes in Homer, "Curse thim ancients! they've stolen all our best ideas!"

As to the mere engineering difficulties to be encountered, it is probable that the actual scooping of the canal itself will involve none of a serious character; for the great level of grassy steppe which extends northward from the slopes of the Caucasus to the very banks of the Don is equally tractable for the purpose of road, railway, or canal. In fact, the real difficulty of the enterprise appears to lie, not in the difficulty of making the actual cutting, but in the shallowness of the rivers which that cutting is intended to unite; the same objection, in fact, which has been urged, with even greater justice, against the projected canal across

* Between Kalatch and Rostoff there are no fewer than *thirty-nine* sand-banks, some of considerable size; and the whole river is so shallow as actually to necessitate a change of steamer at one point. I myself, while descending the Don in 1869, saw a Cossack coolly *ride* across it just in front of our steamer, with a dog following him!

the Isthmus of Panama, *via* Lake Nicaragua and the San Juan River. No one who has seen the Manytch and the Kouma in their present state would think it worth while even to consider the possibility of their serving as a thoroughfare for vessels of any size; and although the artificial deepening of their channels cannot offer any formidable obstacle to a generation possessed of the engineering forces which tunnelled Mont Cenis, and tore up the sands of the Isthmus of Suez, it will undoubtedly make the completion of the task a work of time and labour.

But, granting the undertaking to be feasible, what, let us ask, are the advantages to be expected from it?

The first and most obvious answer to this query is supplied by the *Moscow Gazette*, in its allusion to "the doubling of Russia's naval strength;" for such would undoubtedly be the immediate result of the execution of the project under consideration. A few days voyage would bring another flotilla, hitherto imprisoned within the bounds of the "Caspian Lake," to the aid of that which holds the Black Sea; and the formidable ironclads and gunboats which have till now found no better employment than the occasional bombardment of a Turkoman *aoul* (encampment) or the carriage of munitions of war for some flying column operating against Khiva, or the savages of the Ust-Urt, will find themselves set free to take part in any war which Russia may find for her hand to do. And it cannot be denied that, *ceteris paribus*, such an accession of strength, suddenly thrown into the scale, might, under certain circumstances, make a portentous difference. Had the Sea of Azoff suddenly disgorged the Caspian flotilla upon us in 1855 it might have gone ill with our expedition against Kertch; and even should the combined fleets fail to hold their own against the proved naval skill of Western Europe, there can be but one opinion as to what such a combination might have power to effect in a single combat between Turkey and Russia. The fearful tragedy of Sinope, wrought by the Black Sea fleet alone, is a sufficient earnest of what might be achieved by the two flotillas together; and no one can venture to assert that the chances of another death-grapple between the "Sick Man" and his self-constituted legatee, are among the things of the past. So far, indeed, from this being the case, a new and very promising *casus belli* has sprung up within the last few years. The Sultan's big neighbour has begun to cast longing eyes upon the Turkish port of Batoum, at the eastern extremity of the Black Sea, which, planted as it is almost within sight of the corresponding Russian port of Poti, really seems to have been placed there by some malignant destiny, in order to vex the eyes of Russia with a contrast too glaring to be overlooked. On one side, an irreclaimable morass, and the worst anchorage in the Black Sea; on the other, an excellent harbour, which, walled off as it is from the rest of Lazistan by a precipitous range of mountains, *ought* to belong to Russia. Unfortunately, it happens to belong to Turkey; and the civilizers of mankind, after eight years of costly and laborious efforts to convert the gutter upon which Poti stands, into a tolerable harbour, naturally begin to throw covetous glances at the commodious harbour on the other side of the border. For upwards of two years past, the leading organs of the Russian press have been reiterating, first indirectly, and then point blank, that this modern Naboth's vineyard must be had at any cost—a suggestion not likely to fall upon unfruitful ground among the men who, while lording it over half Asia and two-thirds of Europe, are kept under arrest in their own dominions by the shackles of the Sound and the Bosphorus. In the event of a serious effort being made to translate this Crusader theory into fact (and that it *will* be made, sooner or later, there can be little doubt), the advantage of having one flotilla to keep inquisitive outsiders at bay, while a second does the actual work, is too obvious to require demonstration.

Nor is this the only prospective advantage to be derived from such a combination: the Black Sea flotilla may, in its turn, become a valuable auxiliary to that of the Caspian, in the event of another rupture with a troublesome neighbour, against whom the Double Eagle has made more than one swoop within the memory of living men—namely, Persia. The kingdom of the Shah, holding as she does the same flanking position toward Russia, in Asia, which Austria holds in Europe, might more than once (but for the mismanagement of her rulers and the infamous cowardice of her soldiery) have stayed the flood-tide of Russian conquest in the East; and the treaty of Turkmantchai, with all its humiliating consequences, still rankles in her memory. Granted, then, a fresh rupture between the two countries—what follows? Hitherto, Russia's advances against Persia have been uniformly made overland, by the long and laborious route *viâ* Erivan and Tabríz; but, the Manytch-Kouma Canal once completed, the power of throwing a great armament into the Caspian Sea direct from Kertch or Sevastopol, and of landing an overwhelming force at Enzelli, within 120 miles from Persian capital itself, would suffice to decide the conflict at one stroke—verifying once more the pithy old saying which might fitly be the motto of every history of Asiatic warfare, "He who gives quickly, gives twice!"

One last contingency still remains, which, however improbable, must still be considered in order to make our survey absolutely complete. That there is little or no probability of the diminished stream of the Oxus being ever again led into the Caspian Sea I have endeavoured to show elsewhere;* but should this dream of many generations ever translate itself into fact, the two war-steamers and five gun-boats of the Aral flotilla will be added to the strength of Russia in European waters, and the light craft of the Sea of Azoff be enabled to mount the Amu Daria to fresh conquests in the Far East. That such a possibility is not unforeseen in Russian military circles, I have recently had abundant proof, both oral and printed.

So much for the strategic aspect of the question; but its commercial side has a yet more real and present importance. Now that a fresh trade in sugar and other articles of common use is springing up between Russia and Persia—now that the traffic of Western Asia, relieved by the strong hand of Russian conquest from the systematic brigandage which has kept it down for centuries, is slowly beginning to flow back into its ancient channel, the possession of a route which will avoid alike the tedious and difficult ascent of the Volga to Saratoff, and the long and dangerous caravan journey *viâ* Tabriz and Naktchivan to the Black

* *On the Road to Khiva*, chap. xiii.

MAP OF THE WESTERN SAHAR

BY E. G. RAVENSTEIN, F.R.G.S.

Scale 1: 5.000.000.
0 50 100 150 British Stat. Miles.

The approximate Extent of sandy Desert tracts is indicated by a tint.

18° 16° 14° 12° 10° 8° 6°

28 26 24 22 20 18

Long. W. of Greenw.

CANARY ISLDS.
Palma
Lanzarote
Tenerife
Fuerteventura
Gran Canaria
Gomera
Hierro (Ferro)

ATLANTIC OCEAN

MAROCCO
ADRAR
EL HAMRA
EL DIDI
EL GIDIR
MAGTER
ADAFER
ERGSHESH
EL HODH
ASABA
DUALISH
TIRIS
ADRAR AMAH
ADRAR SEMARA
ADRAR BEN OHMAR
ADRAR MEKU
ADRAR AKSHA
ADRAR SMARA
ADRAR AMELLIL
ADRAR BUKERCH
ADRAR AGNA
ADRAR AMEKNA
ADRAR BU SEBAA
ADRAR IMIXI
ADRAR BARAK ALLAH
ADRAR TASIAST
ADRAR TENDEKHERA
ADRAR INGHIL
ADRAR VAGENETIR
ADRAR AUBER
ADRAR AGNA
ADRAR AMEKNA
ADRAR SHRAEIT
ADRAR BU SEBAA
ADRAR IMIXI
ADRAR BARAK ALLAH
ADRAR TASIAST
ADRAR TENDEKHERA
ADRAR INGHIL
ADRAR VAGENETIR
ADRAR AUBER
ADRAR AGNA
ADRAR AMEKNA
ADRAR SHRAEIT

Uled el Meshduf
Uled el Meshshat
Uled el Hamra
Uled el Gaylyin
Uled Haj el Mokhtar
Uled Barak Allah
Uled Imixi
Uled Bu Sbaa
Uled Bu Sba
Uled Bu Shaa
Uled Bu Sbaa
Uled Bu Sba
Uled Bu Shaa

Zikarna (Shkarn)
Zuetyin Sherqui
Arusin
Tajakant
El Hadha
Tenduf
Tatta
Karheit Hammada
Harga
Tatrut
Granite Mayara
Granite Mts.
Sibisia
Black Sand
Bel Abbas
Veled Nit
Mahamin
el Khang
el Gedam
Sibkha (Sachra)
Granite Mts.
Amul Taf
Tafurt
Buier Ikh
Granite Mts.
Amul Gregin
Tafurt
Amul Tagrin
Szf
Tr
el Khanek
el Khart
Al'tut
Afulle
Laghelia
Meshduf
Jaoara
Tiguel
Tiririm
Ericgi
Basikunu
Nama
Khot e' Asy
Lere
Niara
Lembeidia
Imlugen
Shraudra
Zagruma
Aglia
Tenumjul
Wakore
Meshila
Tagaunga
Tiguel
Tiririm
Ericgi
Basikunu
Nama
Khot e' Asy
Lere
Niara
Lembeidia
Imlugen
Shraudra
Zagruma
Aglia
Tenumjul
Wakore
Meshila
Tagaunga

Wadi Draa
Wadi Nun
Wadi Shbika
Wadi Shbika
Wadi Ziz
Wadi Ziz
Wadi Draa
Wadi Nun
Wadi Shbika
Wadi Shbika
Wadi Ziz
Wadi Ziz

Glemina
Tiznya
Tiznya
Ain el Gertin
Ansis
Wadi Shbika
Wadi Shbika
Tenduf
Tatta
Karheit Hammada
Harga
Tatrut
Granite Mayara
Granite Mts.
Sibisia
Black Sand
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Tafurt
Buier Ikh
Granite Mts.
Amul Gregin
Tafurt
Amul Tagrin
Szf
Tr

MAP OF THE WESTERN SAHARA

BY E. G. RAVENSTEIN, F.R.G.S.

References.
The routes of Caillié (1828), Panet (1850), Vincent, Mage & Bourrel, (1860), Bu-el-Meghdad (1861), Alvan Ali (1861-62) and B. Rohlfs (1862 & 1864) are shown in Red.

Geogr. Mag. Jan. 1876.

Sea, is obviously the greatest advantage which could accrue to either country.

Nor is this all. Whether the Oxus can really be diverted into its ancient channel or not, one glance at the map is sufficient to show that the most direct and obvious way of communication between European Russia and the Principalities of Southern Turkistan, lies through the Oxus and the Caspian Sea. The Orenburg-Tashkend railway, if destined to be constructed at all—and even this seems doubtful—will be a circuitous route at best; and the obvious substitute for it is the establishment of steamers at Tchardjuy on the Bokhariote section of the Oxus (a project which I heard discussed by the engineers attached to the Khiva expedition, as long ago as July 1873, and the feasibility of which has been sufficiently demonstrated by the reconnaissance of 1874), supplemented by the bridging over, with a line of railway, of the 485 miles of steppe that lie between Khiva and Mangishlak, the principal Russian settlement on the eastern seaboard of the Caspian. Northern Turkistan (including the great towns on the Syr-Daria, and the new settlements around Vernoë and Kouldja) must undoubtedly be connected with Russia by a line of railway, and a pretty long one too, the Lower Syr-Daria being utterly unnavigable;* but the rich merchandise of Khiva, the immense traffic of "Bokhara the Noble" (the goods passing through which show an annual total of no less than 6,000,000*l.*), and the priceless mineral treasures of the Upper Oxus, will always find their direct way to the west *viâ* the Caspian. This fact, indeed, was recognized a century and a half ago by the all-embracing eye of Peter the Great, as his capture of the Turkish strongholds on the Sea of Azoff, his attempts to found a great seaport at Taganrog, the embassy sent by him to Tehran in 1718, in order to open trading communications through Persia to India, and, above all, his establishment of Russian traders in India itself, and his despatch of Benedetti's expedition to the Upper Oxus and the Zer-Affshan sufficiently prove. Indeed, had not his increasing wars with Turkey, and the utter ruin that overtook Prince Tcherkaski-Bekovitch's ill-fated expedition against Khiva in 1717, nipped the great reformer's Eastern projects in the bud, there can be little doubt that more than one of the greatest achievements of the 19th century would have been anticipated by the earlier part of the 18th, though there is no reason to believe that even Peter, with all his audacious enterprise and indomitable resolution, ever contemplated so startling an undertaking as the actual hewing of a passage from the Black Sea to the Caspian. But the resources of Russia have quadrupled themselves since *his* day; and in the accomplishment of her favourite scheme of absorbing into herself the entire commerce of Central Asia, it will require a greater obstacle than this to make her hesitate.

Whether the future overland highway of commerce between India and the West may possibly lie through Peshawur, Herat, Merv, Tchardjuy, Khiva, and Mangishlak, instead of Yarkand, Samarkand, and Orenburg, is too wide a question to be discussed within the limits of the present paper. The carrying out or abandoning of the scheme which we have been criticising, rests with the Russian Government; but respecting its feasibility, and the incalculable benefits which its success would confer upon Russia, there can be but one opinion.

DAVID KER.

* The middle section of the Syr-Daria, which bears the appropriate name of Djaman-Daria or Bad River, extending from Fort Perovski to Fort No. 2, a distance of 123 English miles, is barely 1 foot deep during the greater part of the year; and I have myself waded half way across the main stream at Fort No. 1 (40 miles from its mouth) without wetting my shoulders.

THE WESTERN SAHARA.

IT is not very many years since the whole of the Sahara was looked upon as a sandy waste, rising but little above the ocean, the waters of which were supposed to have covered it at no very remote epoch. Recent explorations have disproved this fallacy: they have shown that a portion of this vast desert consists of table-lands and mountain regions, and that it is not by any means quite as inhospitable a region as was at one time supposed. But much remains still to be done before our knowledge of this vast tract of country can be called satisfactory. The Central Sahara, the deserts to the south of Algeria, with their remarkable Shotts, and the Libyan Desert have been explored, to some extent, by scientific travellers, but this cannot be said of the Western Sahara, which is the subject of this month's map. A glance at the history of geographical exploration, as carried on in this quarter of the globe, will sufficiently prove this. Our map shows numerous routes, travelled over by European travellers, but not one amongst them has been laid down from astronomical observations or accurate survey, the jealous character of the natives having prevented this. Our only fixed positions must be looked for towards the margins of the map. They are the sea-board, of which a running survey has been made; the lower course of the Senegal; Timbuktu, carefully laid down by Dr. Barth, though not from astronomical observations; and Insalah first visited by Rohlfs in 1864, and subsequently by Soleillet. We know of but two Europeans who crossed the desert between the Mediterranean and Timbuktu. These are Major Laing and René Caillié. The former was murdered in the desert, on his return journey, and his papers have never been recovered; the latter reached Marocco, though he narrowly escaped a similar fate, after he had successfully overcome the difficulties of the desert, and entered upon a more fertile country. Two other travellers, Roentgen (1809) and Davidson (1836), who attempted to penetrate from Marocco to the south, shared Laing's fate at the very outset of their journeys. An American sailor, Adams, who was shipwrecked near Cape Blanco in 1810, and carried into captivity by the Moors, claimed to have visited Timbuktu, but his description of that city differs so essentially from that of Caillié and Barth, that his veracity has very fairly been called into question. We do not for a moment wish to prefer a similar charge against the other mariners whom ill-luck threw amongst the predatory Moors; but their accounts certainly proved of small or little service in the compilation of our map. These unfortunate men had no opportunity to take notes, and their books were necessarily written from memory, after they had been

redeemed at Wad Nun. Take J. Riley (1815) as an example. He was wrecked near Cape Bojador and carried for a considerable distance into the interior. He describes desert tracts and wadis, but the first geographical name mentioned by him is Widnah (Wad Nun). Saugnier and Follie (1784), Boisson (1785) and Cochelet (1819) have likewise written accounts of their captivities; but, like Riley, they do not supply us with geographical information which can be utilised.

Of great value have been the explorations of some French officers, who started from the Senegal. M. Leopold Panet, in 1850, travelled from St. Louis to Wad Nun. A map of his route has been published, based merely upon compass bearings, and not always in accord with his journal.* Far more satisfactory were the expeditions of Lieut. Mage,† to the frontiers of Taganet (1859-60), of Lieut. Bourrel‡ into the country of the Brakna (1860), and particularly of Captain Vincent into Aderer (1860)‖. The latter was accompanied by Bu-el-Moghdad, an educated negro and assistant-judge at St. Louis, as interpreter, by two spahis and a servant. He openly travelled as an agent of the French Government, whose avowed object it was to conclude a commercial treaty with the chief of Aderer, and though he may be said to have carried his life in his hand from the moment he left the territory of the Trarzas, who have been taught, by severe chastisements, to respect the lives of Europeans travelling amongst them, he not only succeeded in reaching Aderer, but returned with a vast amount of geographical information. He was not, however, permitted to visit Wadan, Atar, and other large towns, and his map is based exclusively upon compass bearings and an estimate of the distances travelled, as he was afraid to make use of a sextant. Vincent's map is by far the most complete of a larger portion of the Western Sahara, based upon personal observation. His companion, Bu-el-Moghdad, crossed the whole of the desert in 1861; his account,§ however, is far from complete, and the map accompanying it, certainly does not coincide with it. We have, therefore, reconstructed his route. At Tifarza, and near Zug, Bu-el-Moghdad crossed the old route of the previous year, and thus far no difficulty occurs. The northern part of the route, however, we found it necessary to alter. The compiler of the original map has evidently taken Panet's map for his basis, and makes our traveller cross the Sakiet-el-Hamra in lat. 27° N. This Sakiet-el-Hamra, however, is not mentioned by Panet at all, who merely refers to an extensive "plain," Sagia. How it got into his map we do not know. Anyhow, the place where Bu-el-Moghdad crossed this dry river-bed must be considerably further to the south. In making this change we are able to identify Barth's Lekarab, with Bu-el-Moghdad's Lakrab without doing violence to either distances or bearings. Indeed, we should not feel surprised at all if Dumus and Dumis, too, were found to be identical, and that the northern portion of Bu-el-Moghdad's route were even closer to that of Panet than is shown on our map. Ued Shbeka is evidently Panet's Shibeika. The principal result of the alteration made by us consists in this, that the Sakiet-el-Hamra joins the Wad Draa from the south instead of from the east, and penetrates far into the heart of the Sahara.

The next traveller to be mentioned is the Laptot Lieutenant Aliun Sal, whose journey took place in 1860-62.* From Matam he went to Walata and thence to Arauan, on the great northern caravan route, and then returned by way of Basikunu and Walata to Bakel on the Senegal River. A glance at the map will at once show the importance of this journey, but our traveller was robbed at Basikunu, and the account rendered by him is far from complete, and hardly ranks higher than an ordinary native itinerary.

In addition to these authentic sources, we have availed ourselves of the itineraries published by various explorers, amongst which those collected by Dr. Barth occupy the most prominent place. Indeed, to Dr. Barth is due the credit of having been the first to publish hearsay information on Taganet, Aderer, and other parts of this desert, which has stood the test of subsequent exploration exceedingly well. Near the eastern margin of our map some of the valuable information collected by Duveyrier has found a place. But even with all these authorities a vast portion of the interior of the Western Sahara remains a blank upon our map, probably because it is more inhospitable than the rest of the country, and is therefore avoided by caravans.

From the accounts of the travellers enumerated, we learnt a great deal respecting the geography of the Western Sahara, though our information lacks precision. The coast between Cape Nun and the Senegal is one of the most inhospitable in the world. Heavy breakers have to be faced at some distance from it for nearly the whole of its extent, whilst winds and currents render its navigation difficult. It is frequented by fishermen from the Canaries, who land sometimes to procure water or to exchange their fish for orchil and wool. In many parts the coast is formed by cliffs of soft sandstone, rising to a height of from 100 to 200 feet. Elsewhere there are dunes of sand, or a beach rising gradually towards a plateau of moderate elevation, which appears to extend for a considerable distance inland. Of vegetation there is hardly a trace, and only towards the south, within the region of tropical rains, do we meet with gum trees and shrubs. No permanent river of any importance enters the sea. Even the Wadi Draa, in spite of its great length and many tributary wadis, does not always contain water, whilst the Rio de Ouro (Gold River) and the St. John's River are, properly speaking, only inlets of the sea, which are gradually being filled up by the sands blown into them from the desert. On old maps we find names of a few rivulets, such as the Roquette, Belta, Tungarza and others; but they are evidently only of small importance, in fact, mere wadis. Amongst the bays, that of Agadir, or Arguin, is the most important. The Portuguese built a fort there in 1445 and even established a factory at Waden, far in the interior of the country, which did not, however, exist for many years.

* *Mittheilungen*, 1859, p. 101 (map).
† *Revue Algérienne et Coloniale*, July 1860.
‡ *Revue Maritime et Coloniale*, II. and III. 1861, map.
‖ *Bulletin de la Société de Géographié*, Jan. 1861.
§ *Revue Maritime et Coloniale*, May, 1861.

* *Annuaire du Senegal*, 1864, and *Zeitschrift für Erdkunde*, vol. xvi., 1864.

In 1638 the Portuguese were dispossessed by the Dutch, and these latter had to give way to the English in 1665, but regained possession of the place the year after, and maintained themselves until 1678, when they had to give way to the French, who in the end remained masters of the place, but subsequently abandoned it voluntarily. Another European factory formerly existed at Portendik, further south, but has likewise been abandoned, not a trace even remaining of the fort, which once stood there.

Our notions of the relief of the interior of the country are still very imperfect, as not a single height has been observed, except in the immediate vicinity of the coast. Timbuktu is supposed to be about 700 to 900 feet above the sea, and the oasis of Tuat, one of the most depressed parts of the desert, has an elevation of 330 feet, according to Rohlfs. We know, however, that there are extensive plateaux and table-lands, ranges of mountains, vast belts of sand hills, and several depressions below the general level, which may fairly be assumed to represent ancient lakes, existing at a time when the Sahara enjoyed a heavier rainfall than it does at present.* Regions of sand-hills form one of the most characteristic features of the desert. They can be traced from the south of Algeria to the coast of the Atlantic, and run generally in a south-westerly direction. They are locally known as Igidi or Gidi, Maghter or Areg, all signifying the same thing, viz., "sand hills." It was supposed formerly that these hills were formed of blown sand. More careful examination has shown that they consist of regularly bedded rocks of Pliocene age, deposited in brackish or fresh water, and the surface of which has been disintegrated by atmosphheric action. The sand is either calcareous or silicious, and these hills appear to resemble in every respect to the Barkhans of the steppes of Turkistan. They are not quite void of vegetation, and the nomads visit them with their herds, after the rains, in search of aromatic herbs.

The country towards the Wadi Draa appears to consists partly of table-lands, partly of mountain ranges, and contrasts favourably with the more desolate regions towards the south. Tiris is an extensive district reaching from near the Bay of Arguin to the Sakia el Hamra, or Red River. It consists of a vast plain of granite, dotted over with hillocks of the same rock, and covered in part with quartz sand. Vegetation occurs only in these sandy tracts, which are therefore much resorted to by gazelles (Captain Vincent counted as many as 100 in a single day). This tract is roved over by the Uled Delim and other tribes, whom Captain Vincent describes to be amongst the most dreaded plunderers of the desert. A tract of sand separates Tiris from Aderer, one of the most favoured districts in the interior of the desert. It is a mountain country, as the name implies, but although numerous springs are to be met with, not one of them is sufficiently plentiful to form a permanent rivulet. The southern portion of this district lies still within the region of tropical rains, and although in some years heavy rains occur only once or twice in October, these suffice for the purposes of cultivation. The riches of the country consist in dates, wheat, barley and water-melons, camels, sheep and oxen. The sedentary population is estimated at 7000 souls, and pays tribute to the dominant nomads, amongst whom the Yaya-ben-Othman are the most powerful. The principal towns are Wadan, Shinghit Atar, and Usheft. Wadan was formerly the most important amongst them, but intestine quarrels have reduced it, and that rank is now held by Shinghit, which has a population of 250 to 300 (according to Panet), or of 3000 to 4000 (according to Vincent); it is surrounded by plantations, and carries on a considerable trade. Caravans from Wad Nun, and the Senegal bring thither European goods, which they exchange for salt. The latter is procured from the Sebkha Ijil or Ishil, near the northern frontiers of the country, where it occurs in four layers, varying in thickness from 1 to 4 inches. About 20,000 camel-loads or 60,000 cwt. of salt are taken away from here annually. Taganet, to the south of Aderer, consists of a barren, northern portion, and of 'Black Taganet' towards the south, where there are high mountains, with forests, sheltering lions and elephants (?). The principal town is Tishit (3000 inhabitants), one of the principal salt-markets. An upland vale,—el Hodh—adjoins Taganet, and is remarkable on account of a series of swamps called Khot ed Dem, which Aliun Ali looks upon as the bed of a vast river, filled only during the rainy season. From indications given by Barth there is reason to believe that this wadi may be traced as far as the frontiers of Aderer, and discharges its waters into the Niger above Yamina. Walata or Biru, the ancient Ghânata, is the principal town of El-Hodh, and carries on a considerable trade in gold, ostrich feathers and honey. Its houses are built of clay and stone and painted in gay colours. Its environs are sterile.

Amongst the districts further towards the west, that of el Juf is perhaps the most interesting. It is bounded on the north and north-west by the plateau of Safie and the sand hills of Ergshesh; towards the south its boundary is not defined, and the remark '(great) hollow of the desert,' which we find on Barth's map, and which points to a depression sinking below the general level of the country, is not borne out by his description, or by that of Caillié, who actually crossed it. On the contrary, el Juf, appears to be more elevated, if anything, than the Niger at Timbuktu. Barth describes it as devoid of herbage and abounding in rock salt. Taodeni, the only village in it, enjoys some reputation on account of its salt-mines, but was evidently of more importance formerly than it is now. Arauan, which lies on the road from Taodeni to Timbuktu, is described as a place of considerable trade, but Timbuktu itself surpasses all the towns named hitherto in population and commercial importance. Since 1863 the town is again in the possession of the Arabs and Tuaregs. Barth estimated its population at 13,000 souls, Caillié at from 10,000 to 12,000.

The Western Sahara is inhabited by a variety of tribes, generally designated as Moors, and bounded on the east by the Tuareg (see map). In former times the negroes extended beyond lat. 20° N. Then came the Arabs, who drove the Berbers into the desert. These established powerful empires, which succumbed to the Arabs during the religious struggles which took place

* The assertion that such a depression extends from the coast of the Atlantic to the Jûf and the neighbourhood of Timbuktu, and represents an ancient gulf of the ocean, which might easily be inundated, is not supported by a single fact mentioned by Panet, Bu-el-Moghdad, or any other traveller, who has crossed that portion of the desert.

on the introduction of Muhammadism. The Berbers, in turn, were subjected or became amalgamated with the Arab propagators of the faith, and thus resulted a population which exhibits more or less the traces of a mixture with negro blood. The character which this population bears is far from favourable, and, although strong caravans composed of Muhammadans may traverse the country unmolested, on payment of the usual fees, its fanaticism would not admit of this indulgence being extended to Christians. Much has been said recently about opening up this region to the world's commerce. In France it has been proposed to construct a railway for that purpose to Timbuktu; in England, a project for inundating a portion of the Western Sahara has been discussed by serious men; but we are of opinion, quite irrespective of the feasibility of either scheme, that it is premature, under present circumstances, to think seriously of vast enterprises of this nature. The natural outlets of the Sahara are Tripoli, Algiers, Morocco on the north, the Atlantic seaboard on the west, and the Senegal and Niger on the south. It is by these roads the necessities of the inhabitants of the Sahara are supplied, and their surplus produce is exported, and they will suffice for a long time to come. As for tapping the more densely inhabited regions of the Sudan, by constructing a railroad to Timbuktu, or forming an artificial sea reaching within a couple of hundred miles of it, a glance at a map and a consideration of the productions of the various countries concerned, must show the utter futility of such schemes.

E. G. RAVENSTEIN.

WERNER MUNZINGER, C.B.

IN M. Munzinger this Magazine has lost a valued correspondent, and the science of geography an ardent scholar. He was recently murdered on the road from Tajurra to Shoa.

Werner Munzinger was born at Alten, in Switzerland in 1832, was educated at Solsthurn and Munich, and entered a business house at Alexandria in 1852. In 1854 he went on a commercial mission to the Red Sea, and resided for some time at Keren, in the Bogos country, where he married and acquired property through his wife. In 1861 he joined the German Expedition, of which Heuglin was leader, and, after a short visit to Europe, he returned to Massowa where he became Consul for England and France. He took charge of the British Consulate in October 1865.

Intimately acquainted with Abyssinian affairs, and having a thorough knowledge of the Amharic language, Munzinger proved a most valuable acquisition to the British field force during the march on Mágdala. He brought to the work a frank, conciliatory manner with the natives, a single-minded zeal, an honesty of purpose, and an ability which did credit to Sir William Merewether's selection. When that able and accomplished officer saw that an Abyssinian expedition was inevitable, he devoted the first half of the year 1867 to collecting information respecting the approaches to the Abyssinian table-land, with the assistance of M. Munzinger. After examining the coast, and making some adventurous and hazardous journeys, Sir William, always with the active and zealous aid of his assistant, was enabled, by an exhaustive method of inductive reasoning, to ascertain which route combined most of the desired qualifications. While engaged on this service with Colonel Merewether, Munzinger made one remarkable journey by himself, crossing the great salt desert which had not been traversed since the days of Father Lobos, and reaching the verge of the Abyssinian Highlands, near Atsbi. This trip was as perilous as it was interesting.

During the subsequent campaign Munzinger was invaluable. In January, 1868, he went on a mission to Prince Kâsa, at Adowa, where his intimate knowledge of the language and people proved of the greatest use. At Antâlo a still more important duty was entrusted to him. He was sent far ahead of the English advancing force, to report upon the routes, to see the native chiefs, and to secure their assistance or friendly neutrality. The service was one of considerable trust and some danger, and required qualifications which are not often combined in one person. M. Munzinger was a man of great simplicity and singleness of mind, he was devoted to the cause, and ready to make any sacrifice or run any risk to secure its success. He made a rapid journey to the camp of Gobazye, sending back daily itineraries of the road, reconnoitred Mágdala, collected grain for the troops, and rejoined head-quarters on the Wadela plateau. He was at the capture of Mágdala, and continued to do good service until the last man of the expedition left Annesley Bay.

M. Munzinger was deservedly rewarded for these eminent services, by being created a Companion of the Order of the Bath.

In 1870 he performed a very interesting journey through Southern Arabia, with Captain Miles, and on his return he was appointed Egyptian Governor of Massowa and Suakin, where he devoted himself to improving the towns by building an aqueduct and constructing other public works. He also promoted the cultivation of cotton in Tokar. In 1872 he occupied the Abyssinian province of Bogos with Egyptian troops, a measure which was attended with most beneficial results. He established peace along the whole frontier line dividing Egyptian and Abyssinian territory, put a stop to the incessant murders and kidnappings, settled long-standing feuds, and many fugitive Christians, who had fled from Bogos, returned. M. Munzinger was a zealous and sincere Roman Catholic.

He is the author of *Die Sitten und as Recht der Bogos* (1859), and *Astafrikanische Studien* (Schaffhausen 1864), as well as of two valuable papers in the *Journal of the Royal Geographical Society*. The first is a "Narrative of a Journey through the Afar Country," with maps, read on April 26th, 1869, and the second a Report of an excursion into the interior of Southern Arabia read on June 12th, 1871. M. Munzinger was an Honorary Corresponding Member of the Society.

There will be many who served in the Abyssinian Expedition who will hear with regret of the loss of an old friend and most agreeable companion, one whose good nature never failed, whose kindly disposition won regard, and who was always anxious to oblige and to render services to his comrades. He was an accomplished scholar and a sound geographer.

Reviews.

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LORD COLLINGWOOD.*

UNDER the title of "A fine old English Gentleman," Mr. Davies gives to the public a life and elaborate analysis of the character of Lord Collingwood. A life so full of incident and interest, and a character so pure, beautiful, and exalted, that the one can hardly be read and the other never studied too often. Mr. Davies is a moralist, and he could not have chosen a better subject on which to preach an eloquent sermon to what he considers a degenerate age; but it is to be regretted that his zeal should have led him, in admiration for his hero, to depreciate unduly many of Lord Collingwood's great contemporaries; even Lord Nelson hardly escapes. This is unnecessary, Lord Collingwood can well afford to stand on his own merits.

Cuthbert Collingwood came of an ancient but reduced family in Northumberland, and was born in 1750, eight years before Nelson. He entered the navy when only eleven years old, a pretty and gentle boy, as his schoolfellow, Lord Eldon, described him; and very pathetic is his son-in-law's account of his first introduction to a man-of-war*—"That as he was sitting crying for his separation from home the first lieutenant observed him; and pitying the tender years of the poor child, spoke to him in terms of much encouragement and kindness, which, so won upon his heart, that, taking this officer to his box [not cabin, as Mr. Davies puts it] he offered him in gratitude a large piece of plum-cake which his mother had given him."

It is likely that the intimate acquaintance with every detail of his profession, for which Collingwood was celebrated, was, in part at least, owing to his entering the service thus early. And this is a point which we think the Admiralty have overlooked in fixing a later age than formerly for the entry of cadets into the Royal Navy.

Collingwood's friendship with Nelson began in 1776, when they were both lieutenants in the 'Hornet,' and they both served together, in 1780, in an expedition sent to attempt a passage across Central America in boats lying off the River San Juan and the lakes of Nicaragua and Leon. In this foolish enterprise the lives of the two men, who twenty-five years after won the crowning naval victory of Trafalgar, were nearly sacrificed. The malaria of that deadly climate attacked the expedition. Nelson's life was only saved by his return to England, and though Collingwood recovered from the attack, it is not unlikely that the seeds of disease were thereby laid in what was naturally a strong constitution. In four months 180 men of the 200 who composed the crew of the 'Hinchinbroke,' in the command of which Collingwood succeeded Nelson, died. We are disposed to think this service, in which Collingwood stood firm in a long contest with the horrors of pestilence, the most heroic of his life. Such a value did the Admiralty of that time set on Collingwood, that from 1793 to his death in 1810, he was but one year in England. The length and hardship of his services are said to have been without parallel, and to them his life was doubtless sacrificed—a short-sighted policy on the part of our naval government, but still evidence that they knew the value of a good officer when they found one. And here we would call attention to the fact that both Nelson and Collingwood rose, in what is commonly called a corrupt age, to the highest commands and honours without any special interest, entirely by their own merits.

Collingwood commanded the 'Barfleur' in Lord Howe's great battle of the 1st of June 1794, and Mr. Davies is indignant that he received no *insignia* or *distinction;* but the fact is that the 'Barfleur' was not one of the ships which contributed most to the victory, and though it is natural that Collingwood and his friends should have felt annoyed at what seemed to them a slight, yet there were many other captains of ships engaged who were, like him, passed over. Collingwood himself has been charged in the neglect of a deserving officer in omitting the name of Captain Hardy in his despatches after Trafalgar. Collingwood took a very prominent part in the battle of Cape St. Vincent, for which he received the thanks of both Houses of Parliament and a gold medal, besides the medal for the 1st of June, to which he had considered himself entitled.

Collingwood was second in command at Trafalgar, and his noble bearing evoked Lord Nelson's famous words, "See how that gallant fellow Collingwood takes his ship into action." Mr. Davies's explanation of the vexed question as to whether Lord Nelson, after he was struck, sent an officer to Collingwood to desire him to conduct the fleet or not appears to us satisfactory. For his conduct on that great day Collingwood received the high honour of a peerage, a pension of 2000*l.*, and the thanks of both Houses of Parliament.

The French naval power may be said to have been annihilated at Trafalgar; such ships as they had left, they prudently kept in their harbours; any great engagement was impossible, and our sailors had to be content with the dull and monotonous work of watching the enemy's ships and blockading the continental ports, varied occasionally by actions on a smaller scale. In this tedious labour the remaining years of Lord Collingwood's life were passed; his health, undermined by early hardships and too continuous service, gave way, his applications to the Government at home to be relieved were disregarded, and on the 9th of March, 1810, he died on board his ship the 'Ville de Paris,' leaving behind him an example to future generations of Englishmen of a life spent in devotion to his country, and guided and governed by the purest patriotism and most unflinching sense of duty.

Lord Collingwood's private character was without a blemish: he was equally great at home and in public. His letters, which were first given to the world by his son-in-law in 1827, and on which Mr. Davies has based his present work, are models to be followed. An eminent English diplomatist said of them, "I know not where Lord Collingwood got his style, but he writes better than any of us." In his private correspondence we read his whole soul—the loving husband, tender but not over-indulgent father, the

* *A Fine Old English Gentleman, exemplified in the Life and Character of Lord Collingwood.* A biographical study by William Davies. (Sampson Low, 1875.)

* See *Selections from Lord Collingwood's Correspondence*, 5th ed., 1837. Vol. i. p. 7.

hearty friend, the kind master. We see hardships nobly borne; advice and instruction given with sound judgment and tact, deep religious feeling. The perusal of his letters to his wife and daughters will show what that courage and patriotism must have been which bore a separation from these loved ones for more than seven years. He left them in the spring of 1803, on the resumption of hostilities with France, and never saw them more.

Mr. Davies's book is a perfect philippic against the present age—our manners, education, locomotion and whatever else respecting it comes under his notice; but is there any reason to fear that the spirit of the heroes of the great war is extinct? We rejoice to think that such men as Collingwood may still be found in the service; one indeed, whose untimely end the service and the nation are still mourning, Commodore Goodenough, was in most respects a counterpart of Lord Collingwood. Both were men characterised by the same high sense of duty, patriotism and professional knowledge, by the same humanity and solicitude for the welfare of those committed to their charge, whether men or officers.

The private lives of both were adorned by the same purity, by the same tender affection for those nearest to them; both were guided by the same deep and vital religion; both died in the service of their country.

WILLIAM WICKHAM.

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THE EASTERN SEAS.*

THIS book we can confidently recommend to our readers. Captain B. W. Bax is a careful observer, and has the good sense to eschew fine writing. He tells us in plain language what he saw during his command of the gun-vessel, 'Dwarf' from July, 1871, to November, 1874, in the China seas, and the result is a book both agreeable and full of valuable information.

The 'Dwarf' was constantly on the move, and visited the coasts of China, Tartary and Eastern Siberia, the island of Formosa, and the Japanese and Loo Choo groups. Perhaps the most interesting parts of Captain Bax's narrative are those which describe the island of Formosa and the Russian settlements on the sea coast of Tartary.

Our readers are already aware that Formosa, *the beautiful island*, is as yet only in part subdued by the Chinese, who occupy the western half; the eastern is still in possession of the aboriginal savage tribes.† The civilized aborigines called Peppohoans, with whom Captain Bax had much intercourse, are described as a simple, civil, and industrious race, amongst whom Christianity is spreading rapidly. Captain Bax's account of the labours of the missionaries, both in China and Formosa, is very favourable, and he gives us two touching stories of the sincerity of converts which will be found at pages 84-86.

The Russians have lost no time in establishing themselves in their recently-acquired possessions south of the Amur in Tartary. Their principal station is called Vladivostok or the Golden Horn: here are barracks, schools, a dock-yard and two electric telegraphs to Europe, one overland through Siberia, the other through Japan and Shanghai. From Nikolaevsk, an older settlement at the mouth of the Amur, letters can be sent to England by three different routes, one through Siberia, another across the United States, and the third by the Peninsular and Oriental and Brindisi line. At Nikolaevsk salmon are so abundant that fish weighing from six to nine pounds were sold at a penny a piece.

The importance of the acquisitions south of the Amur to the maritime power of Russia cannot be overrated. Russia may be said to have thereby obtained the command of the sea of Japan. The harbour of Vladivostok, except in very severe seasons, is rarely sufficiently frozen to interrupt communication entirely for any length of time; coal is found both on the mainland and in Sagalien Island; and in the interior are vast forests, which, with wisdom that other nations would do well to imitate, the Russians carefully preserve.

We should gladly, if our space allowed of it, follow Captain Bax in his ascent of Fusiyama, and we now take leave of him with the hope that he will, after his next command, publish another narrative as pleasant and instructive as the present one.

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JAVA.*

THE work on Java, by Professor Veth of Leyden, the learned President of the Dutch Geographical Society, is the first complete monograph on that magnificent island, and will in future be the standard book on the subject of which it treats. Professor Veth has done for Java what Sir Emerson Tennent did for Ceylon, but with far more elaboration and completeness.

Hitherto there has been no accurate description of Netherlands India, nor even of the whole of Java, written in Holland. The few years of English occupation produced both. Crawfurd's *History of the Indian Archipelago*, and the *History of Java* by Sir Stamford Raffles, though dating half a century back, have not been replaced, and are still the only works to which to refer. In Holland the publication of Count Van den Bosch is merely a large political pamphlet; that of Temminck is a mere sketch, defective in many respects, and that of Professor de Hollander is an excellent student's manual, but not a work for the general reader. These books refer to Netherlands India generally, but Holland was not better off for books specially on Java until the publication of Professor Veth's work. Junghuhn's Java is a comprehensive monograph on the geological structure and vegetation of the island, but it is confined to those two branches of the subject; and the admirable work of De Yonge is devoted to the rise of Dutch power only, without reference to native history.

The first volume of Professor Veth's work has now appeared, and, when the others follow, it can no longer be said that Holland has not produced a complete monograph on her great eastern possession. This first volume is divided into two books, on the

The Eastern Seas. Being a Narrative of the Voyage of H.M.S. 'Dwarf' in China, Japan, and Formosa. By Captain B. W. Bax, R.N. (Murray) 1875.

† See the *Geographical Magazine* for October 1874, p. 292; also for April 1873, p. 14; and January 1874, p. 410.

* *Java:* Geographisch, Ethnologisch, Historisch. Door P. J. Veth, Hoogleeraar te Leiden. (Haarlem, Erven F. Bohn, 1875.)

geography and ethnology of Java. The first book contains eight chapters on the situation and climate, coast line, condition of the soil, mountain and river systems, geology and mineralogy, vegetation, invertebrate and vertebrate animals. The seven chapters of the second book treat of the statistics of population, the physical and moral character of the people, their religion and laws, language and literature, arts and sciences, means of subsistence, domestic and social life. The second volume will comprise the native history of the island, and a review of the institutions which the Dutch have introduced. The third volume, in three books, devoted respectively to Western, Central, and Eastern Java, will give a description of each province. The first volume is illustrated by a physical, the second by an historical, and the third by a travelling map of the island.

Professor Veth's design is to produce a standard work. There can be no doubt that this design will be successful, and that when the question is asked what book should be consulted to acquire a view of the present knowledge of java, the answer unquestionably must be that of Professor Veth. It was awarded a first-class medal by the Jury of the International Exhibition of Geography at Paris.

We would very strongly recommend the translation of Professor Veth's *Java* to the attention of publishers in this country for, like Emerson Tennent's *Ceylon*, it will not only be very generally read as an exhaustive and complete account of the most important island in the Eastern Archipelago, but will be valued as an indispensable work of reference.

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THE AMAZONS: Diary of a Twelvemonths' Journey. By *G. R. Stewart Clough*, on a Mission of Inquiry, up the River Amazon, for the South American Missionary Society.

THIS is a very interesting journal, by an earnest man who has undertaken a difficult journey for a noble purpose; but whose observations on the scenery, the towns and settlements on the Amazon, and the people are well worthy of perusal, apart from their main object. Mr. Clough gives an excellent account of the River Purus, and of the tribes on its banks, and refers with just praise to the admirable survey of Mr. Chandless (the name is misprinted Chandler throughout). He also visited Teffe, Tabatinga, and the Peruvian establishment at Iquitos, the principal commercial entrepôt on the Marañon. His furthest point was Yurimaguas on the Huallaga, whence he returned to Para in January, 1873. We believe that Mr. Clough has gone up the great river a second time, and that he is now on the Purus.

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STANLEY'S EXPLORATION OF THE NYANZA. (*Mittheilungen*, 1875, p. 455.)

DR. E. BEHM prefaces a translation of Stanley's letters by a few explanatory remarks. He speaks of the Baringo as a distinct lake, and considers that the connection between the Mwutan Nzige and the Nile has not yet been satisfactorily settled, though universally adopted as a fact by geographers. He thinks it just possible that Sir Samuel Baker may have been misled by the natives, in the same way as he was misled with reference to the connection between the Mwutan and Tanganyika. He thinks the Nile in the country of the Madi, to be a very small river to originate from two large lakes, and the Mwutan may possibly discharge an effluent towards the south or west, in the direction of the Lualaba. If Dr. Behm is right, the Nyanza, Mwutan and Tanganyika would belong to the basin of the Congo, and the Nile sources would have to be looked for in another direction altogether. The map accompanying this paper is based upon the one published in the *New York Herald*, and Speke's routes are adjusted to the outline of the lake as given by Stanley.

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COSMOS: Di *Guido Cora*. Vol. II., Parts x., xi., and xii., and Vol. III., Parts ii. and iii. Turin, 1875.

SIGNOR CORA'S geographical perodical, two numbers of which have very recently reached us, opens with an account of the explorations of Professor F. V. Hayden, during 1873, in the Rocky Mountains; of Captain Jones in the western part of Wyoming territory; and of Lieutenant Wheeler in the southern parts of Arizona and New Mexico, adjoining Mexican territory. These articles are illustrated by a general map of the western part of the United States, and a larger scale map of the region south of the Yellowstone National Park. Next comes a note respecting the labours of an Italian engineer of scientific repute, named F. Giordano, who is at present working up for publication the results of a voyage made by him round the globe. A letter from Signor Beccari, giving interesting particulars respecting some of the ethnological features and customs of the Papuans claims attention, and among the remaining papers we must mention the first part of an able compilation by the editor, of the results of voyages to the east of Spitzbergen, illustrated by a map showing Wiche-Land, North East Land, with Nordenskiold's explorations made in 1873, and Francis Joseph Land.

The last number of the *Cosmos* contains a good budget of original matter. Foremost appears notes of a voyage along the coast of Borneo, made by the surveying corvette, the 'Governolo,' the first portion of the article relating to a short sojourn made at Sarawak, the second to the cruise from Sarawak to Labuan, and the third to an ascent of the Kini-Balu Mountain (13,450 feet), an interesting summary of recent exploration in New Guinea by Beccari, and the Royal corvette, Vettor Pisani in the north-west, the Russian traveller Maklay, in his second trip, in the south-western portion, and of the English missions, and Signor D'Albertis along the south coast. In connection with the above Signor Cora mentions that there has just appeared in Holland an account of Von Rosenberg's travels in New Guinea in 1869 and 1870. It contains a map of Geelvink Bay, which contains some useful topographical information, but which unfortunately did not come to hand soon enough to be incorporated in Signor Cora's own map. We must not omit to notice the neatness and accurate drawing of the two new maps of the north-western extremity of New Guinea, which illustrate the long article devoted to the recent exploring work in that island. We have noticed in another column the correction of the geography of Geelvink Bay as determined by Signor Beccari.

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LES COURANTS DE LA MER ET L'ATMOSPHÉRE. Par *Dr. Buys Ballot*, Directeur de l'Institut Royal Météorologique d'Utrecht. Bruges, 1874, pp. 39.

DR. BUYS BALLOT, one of the greatest authorities on meteorology, has set forth in this pamphlet in a clear and intelligible manner, the chief laws by which, as observation proves, the marine and atmospheric currents are caused. The operation of the sun's heat, as a first cause, modified by the rotatory movement of the earth, is first explained, and the author next proceeds briefly but lucidly, to dwell on the dilatation produced by heat as well as the change of form imparted by it to certain bodies, such as the transformation of water into vapour. Dr. Buys Ballot renders full justice to the practical accuracy of Maury's *Sailing Directions*, points out that the

laws governing terrestrial and marine meteorology are one and the same, and shows that it is in the power of sailors especially to aid materially towards a better comprehension of their general character and effects, by obtaining increased data in the shape of recorded observations from every quarter of the globe. The work is admirably designed, by simplicity and yet thoroughness and accuracy of treatment, for the use of untrained observers.

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BIBLIOTHECA GEOGRAPHICA: A classified catalogue of German and Foreign Geographical Works. By *Dr. W. Müldener*. Göttingen (Vandenhoek and Ruprecht).

THE 22nd annual volume of this valuable bibliographical work has just been issued, and the publishers announce that they are not inclined to continue it, unless they meet with better support amongst geographers and geographical societies. They suggest that the latter might either subscribe for a number of copies or subsidize the enterprise by an annual money-grant. The annual subscription only amounts to 1*s*. 6*d*., and a set of the twenty-two volumes published costs 24*s*. We do not hesitate to say that it is very desirable to continue the publication of this useful book of reference.

Log Book.

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Safety of Cameron.—This is joyful news, indeed! The brave young lieutenant has placed himself in the foremost rank of African travellers by an achievement which has been equalled only by Livingstone, surpassed by no former explorer. He telegraphs his arrival from Loanda on the 22nd of November, 1875, with the fact that he was forced by adverse circumstances to abandon the Congo route, and had made his way across the continent in a more southerly direction. He left Ujiji on the 19th of May, 1874, since which date, an interval of a year and a half, he had not been heard of. Almost without resources, with no European companion, suffering from illness, he started upon this desperate enterprise. A glance at the map in our number for January, 1875, will show how important must be his discoveries. They include the whole of the vast region between Livingstone's routes on the east, and those of Ladislas Magyar or Graça from the west; which, at the nearest points, are at least 300 miles apart. If Cameron took a more northerly course his discoveries extend over 500 or 600 miles. Under any circumstances they must be on a grand scale. We await the particulars of the great traveller's discoveries with deep interest. In the meanwhile we may feel assured that they were achieved without bloodshed, without leaving angry feelings behind him, and with credit to the country, for they were achieved by an English naval officer.

Naval officers have done much good work as African travellers, and Cameron now takes his place as first in the glorious list, which includes Lyon, Clapperton, Tuckey, Baikie, Julian Baker, and Grandy. But it is not in Africa only that inland discoveries have been made by naval men. A sailor discovered the source of the Oxus; another crossed Arabia from sea to sea; others surveyed the plains of Mesapotamia. In North America Franklin, Richardson, and Back upheld the fame of their profession. In South America naval men first explored the Amazon, and a sailor is the only white man who has traversed the length of Patagonia from south to north. In the first rank of this gallant company Cameron takes an honourable place as the only European who ever walked across Africa from east to west.

Russian Arctic Exploration Projects.—Announcement was made at a recent meeting of the Society for the Encouragement of Commerce and Industry, in St. Petersburg, that a person who does not wish his name to be known, has offered a sum of 25,000 rubles (3125*l*.) towards a scientific expedition to explore a commercial route from Northern Russia to Behring's Straits. Professor Nordenskiold has agreed to accept the leadership of the expedition, which will start next summer.

Subscriptions to the amount of 26,000 rubles (3250*l*.), have also been received towards the cost of another expedition composed of two vessels, which shall last three years, and shall explore the Gulf of Obi as well as the sea-route between Archangel and the great rivers of Siberia. The command of this one will be entrusted to Captain Wiggins, of Sunderland, who has, however, stipulated for full liberty of action in unforeseen circumstances, and who has remained in St. Petersburg, waiting for the replies of the mayors of Irkutzk, Krasnoyarsk, Tobolsk, Tiumen, Tomsk, and Ekaterinburg, who have been invited by telegraph to co-operate in forwarding the enterprise. A reply has since been received from a proprietor of gold mines at Krasnoyarsk contributing 500*l*. to the expenses of the undertaking.

Zuyder Zee.—Whilst engineers are proposing plans for converting a portion of the Sahara into an inland sea, the Dutch have matured a plan for recovering a large portion of the Zuyder Zee from the ocean. At the time of the Romans the area of the present Zuyder Zee was occupied by a small lake, Lacus Flevo, which communicated with the North Sea, through the Flevum Channel. In 1282, after one of those catastrophes which have so frequently swallowed up entire districts along the eastern shores of the German Ocean, the present Zuyder Zee was formed. Propositions for recovering this loss were made in 1849 by Diggelen, and in 1865 by Beyerinck, an engineer employed by M. Rochussen, a man of great enterprise. It was ascertained that a large portion of the sea-bottom consisted of most productive soil, and that its recovery would not be attended by unusual difficulties. The question was referred to a government commission, who reported favourably, in 1873, and as the Chambers have granted the requisite funds, this great drainage work, which will put into the shade the drainage of the Haarlem Mere and of the Y is to be taken in hand forthwith.

An immense dyke, 164 feet wide at the bottom and rising to a height of 26 feet above the level of the sea, will be thrown up to exclude the waters of the ocean. It will extend from Enkhinzen to the small island of Urk, and thence to Kampen, and its total length will be 25 statute miles. The enclosed area will then be divided into squares, and the water pumped out. Navigable canals will connect Amsterdam, Hoorn, Eidam and other places, which are scarcely accessible

now, owing to the shallowness of the water, with the open sea. The area to be drained in this manner is estimated at 485,775 acres (759 square miles), of which 370,000 acres will consist of most fertile arable land. The expenses are estimated at 9,600,000*l.*, or 19*l.* 13*s.* an acre. The importance of this enterprise may be estimated from the fact that the total area of the Netherlands only amounts to 12,679 square miles, which will thus be increased to the extent of nearly 6 per cent.

Siberia.—Admiral Posyet, in a letter published in the *Sibir*, protests against sending to Siberia the refuse of the 70,000,000 of inhabitants of European Russia. He demands that Siberia be no longer treated as a convict settlement, and says that the convicts are at the root of all complaints about misgovernment and want of labourers. Criminals ought to be reformed, and not only to be punished. The former is impossible as long as the present system is allowed to continue. The long journey alone, in the company of criminals of the deepest dye, must corrupt the morals of any one brought into contact with them. Nor are the dwellings in Siberia and the mode of life and labour of the convicts calculated to reform them. Most of them are employed in the gold washings. At Ust Yart, where the nominal roll of convicts was 2000, Posyet found that 200 were ill with scorbute, and 300 had escaped. The remainder did their work slowly and sulkily. The prisons of Siberia are full of convicts, criminals and unconvicted persons, and the latter have frequently to wait years for their sentence, and even when pronounced not guilty, they leave the prison utterly corrupted. This pernicious system, with its baneful consequences, is allowed to continue, in spite of all protests. Reforms, which were proposed some time ago, have been put off for financial reasons.

Khokand.—That portion of Khokand which lies to the north of the Syr Darya and the Naryn, has been formally incorporated with the Russian dominions, and an occupation of the remainder of the country may be rendered necessary in consequence of the continued resistance offered by the Kipchaks. They were beaten by General Skobelef on the 23rd October, at Tura-kurgan, about 10 miles west of Namangan, and that officer then continued his march upon Tus. But events at Namangan recalled him. During his absence the Kipchaks had entered the town and roused the inhabitants to revolt. The citadel and the Russian camp were surrounded, and though the attacks made upon them were beaten off, the Kipchaks succeeded in entrenching themselves in a portion of the town. Skobelef returned on the 7th November, and on the following day he bombarded the town, and drove the enemy out of it. The losses suffered on this occasion by the Kipchaks are stated to have amounted to 3800 men, the Russians only losing 6 killed and 38 wounded. This defeat, however, by no means discouraged the enemy. They assembled a force of 20,000 men, near Balikchi, on the left bank of the Syr, where Skobelef attacked them on the 24th November, and again defeated them with great slaughter, his men making use only of the bayonet and sabre (were they short of ammunition?). The position of the Russians at Namangan is a critical one in spite of these repeated victories, and reinforcements are urgently demanded. The country between Namangan and Khojend is by no means safe, and small detachments of Russian troops have been attacked repeatedly. One body of insurgents, 2000 strong, even ventured near Makhran, now occupied by Major Rodyanski, who drove them off. (See our map of Khokand, *Ocean Highways*, August, 1873.)

Ruins in the Steppes of Turkistan.—The Russians have discovered the ruins of a large town in the Steppes near the Atrek. Several minarets, in the Arab style, are still in a good state of preservation. The vicinity of this place is said by the Turkmen to have been very fertile in former times, and there still exist traces of an extensive system of irrigation.

Discovery of Father Desideri's Journal in Tibet.—A literary discovery of some importance is reported from Italy, being the narrative of the journey and residence in Tibet, in the early part of last century, of the Jesuit missionary, Father Ippolito Desideri, of Pistoja. Our previous knowledge of Desideri's journey through Ladak into Tibet, and his sojourn at Lhasa was solely derived from a letter of his, of a few pages, addressed from the latter place to a brother missionary in Mysore. This letter was published in the *Lettres Edifiantes*, vol. xii., new edition, p. 430. Signor Puini, formerly Secretary to the Italian Geographical Society, has now discovered in the library of a private gentleman of Pistoja, a large folio volume of some 500 pages of MS. containing a great abundance of notices respecting the geography, manners and customs, and religion of the countries visited by Father Desideri, and in which he resided for about fifteen years. Two other documents have also been found by the same gentleman in the library of the Congregation of the Propaganda: a narrative of Desideri's, written in 1717 (or ten years before the Pistoja MS., which is dated 1727), and an autograph letter, both of which are addressed to the Pope. Signor Puini has made arrangements for writing an ample paper on Desideri and his journey, based on the MS. volume, and at some future time hopes to publish the MS. itself with the necessary elucidations.

Annam.—The treaty with France has at length been ratified. The harbours of Thinai, in the province of Bin Diñ, of Niñ-hai in the province of Hai-duong, and of Hanoi (Kesho), on the Song-ka River, are opened to the flags of all nations. The transit of merchandise between the coast and Yun-nan, by way of the Song-ka, is permitted, but arms can be imported into China only by special permission. Thuan-an, the harbour of the capital, remains closed even against French men-of-war. The French flag will enjoy a few privileges.

The Cholera Epidemy in Syria, 1875.—The cholera first made its appearance at Hama, a small town five days north of Damascus, where it appears to have been imported by troops from Arabia. The place was surrounded by a military cordon, but the cholera broke through it, and spread nearly over the whole of Syria. It made its appearance at Damascus, Aleppo, Antiochia, Latakia, Tripolis, Saida Jebleh, Beyrut, and in a few places in the Lebanon. At Damascus its ravages were most extensive, and between the end of June and the middle of August 9319 persons died from it, including 8894 Muhammadans, 278 Christians and 147 Jews. At Beyrut, 153 persons died between the 27th of July and 15th of

September. The ravages of this year's epidemy were far less than in 1865, and this favourable result is ascribed to sanitary measures, to an unusually low temperature, and to the fact that many of the inhabitants retreated to the Lebanon when the cholera first made its appearance.

Census of Massachusetts.—A state census just taken shows the population for 1875 to be 1,651,652, viz. 794,284 males and 857,368 females. This is an increase of 194,301 or 13.4 per cent., since the Federal Census of 1870. The towns have increased more rapidly than the rural districts. The following are the figures for the chief amongst them :—Boston, 341,919; Cambridge, 47,838; Fall River, 45,340; Lawrence, 34,907; Lowell, 49,677; Lynn, 32,600; New Bedford, 25,826; Salem, 25,955; Springfield, 31,053; Taunton, 20,429; and Worcester, 49,265.

Peru.—A treaty settling the boundary between Brazil and Peru, on the Putumayu, a northern tributary of the Amazonas, has been ratified. Moquegua has suffered considerably from an earthquake, on the 23rd September, the shock being felt as far as Tacna and Arequipa. At Iquique 19 cuadros or blocks of houses have been destroyed by a conflagration on the 7th October.

Exploration in New Guinea.—Signor Odoardo Beccari, who for the last few years has been engaged in making researches in the natural history of New Guinea and adjacent isles, has just completed an important piece of geographical work. Owing to subsidies granted to him by the municipal and provincial authorities of Genoa, he was enabled to hire a schooner with a crew of ten men, six hunters and a boy for making collections. Three small bronze guns were provided in order to instil respectful feelings into the Papuans, and supplies for eight months were laid in. Thus equipped, Signor Beccari has occupied the time from January to August, 1875, in exploring the islands and coasts of north-western New Guinea. He has discovered a river called Wa Samson flowing from east to west for a distance of about 215 miles, from the Arfak Mountains to a point just to the east of Galevo Straits, and constituting thus the chief drainage of the interior of Papua Onin, or the north-western peninsula of New Guinea. He has also explored Geelvink Bay, which separates this peninsula from the main bulk of the island, and has made a most important, though rough, rectification of the configuration of the bay as shown in the best charts, involving in some places a shifting northward of its coast-line to the extent of 30 miles. It is not nearly so deep a recess as shown in the English Admiralty Chart. Signor Cora, from whose journal *Cosmos* we take this information, states that our delineation of the hydrography of the bay was until now based on an old Dutch chart of 1705.

Personalia.—Dr. WAGNER, editor of the Almanach de Gotha, has been appointed Professor of Geography at the University of Königsberg.

Lieutenant LUX, of the German African Expedition, has been obliged to give up the journey to the Muato Yanvo on account of ill-health. Dr. Pogge and Dr. Lénz alone remain now, and an expedition which was started under the most auspicious circumstances has thus far done very little towards the discovery of new countries.

Correspondence.

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GEOLOGICAL EXPLORATION IN THE AMU DARYA DISTRICT.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—After a perusal of Professor Barbot de Marny's interesting account of his geological exploration in the Amú Darya district, a translation of which you publish in the *Geographical Magazine* for December, 1875, I beg a place in your columns for a few remarks upon the conclusions of the learned geologist.

The results of the exploration are summarized as follows:—(1.) Marine formations were met with along the whole route travelled, which proves that an Aralo-Caspian Sea at one time extended to the foot of the Thian-Shan. (2.) The isolated mountain ranges of these regions are referred to the same movement of upheaval as that to which the Thian-Shan is due.

As to these passages, I would remark, that if the Aralo-Caspian Sea referred to be that belonging to a geological epoch far anterior to any human tradition of the localities, the statements of the learned Professor are doubtless beyond criticism. But the other two results of these explorations seem to imply that M. Barbot de Marny alludes also to the historical puzzle, which even, for want of sufficient data, the illustrious Humboldt himself had a difficulty in resolving satisfactorily.

M. Barbot de Marny's third result gives a negation to the idea that the sand-hills of the steppes may have been due to the waters of a former ocean; and his fourth result attributes the origin of the salt swamps of the desert to the efflorescence of cretaceous strata, and not to any recent marine deposits.

The whole of these regions, we are told, are composed of formations of the age of the chalk, which were deposited on the bed of an ancient Aralo-Caspian, and through which certain mountain ranges were upheaved. In this information there is nothing more than what Humboldt described half a century ago to be the phenomena which characterised these regions at a former geological epoch. But the interesting question, what has here happened since man not only inhabited these localities, but since other men described them in terms that are now inapplicable, is scarcely touched upon by the learned Professor. In the little he does say on this head, it seems to me that the geological and historical aspects are mingled in such a way as likely to mislead, and a word or two of caution may not therefore be out of place.

The sand-hills which the Professor frequently heard asserted to be due to the action of water are, he states, caused by the wind of the steppes, which disintegrates the friable sandstone elevations. But as regards this, it should be borne in mind that there may be other sand-hills, partaking of the nature of dunes, which *may* have been caused by aqueous action. Such phenomena are certainly observable all round Lake Aral, except on the west side; and generally speaking sand dunes are observable on levels lower than the contour line of 220 feet above the sea, in the Aralo-Caspian region. The learned Professor's remarks seem to apply, I would beg to note, to country situated above this level. For, he crossed this line but once, near Núkús at the head of the lower branches of the Amú; though he saw it at another point, to which I shall presently refer more piticularly.

As regards the salt swamps of the desert, which are declared not to be due to recent marine deposits, but to the efflorescence of cretaceous strata, I would beg to point out that such a *dictum* by no means excludes the possibility of these swamps having been covered by *fresh* water, in the earliest historical times. Below the contour line mentioned, such swamps may have been covered by the waters of a recent Aralo-Caspian Sea; while above that line they may have been drowned by floods of the rivers of these regions, which now have

different courses or have been entirely desiccated. These statements therefore of Professor Barbot de Marny do not affect the previous existence of the Aralo-Caspian Sea in early historical times; and I venture to regard them with a critical eye, only in such aspects as they may seem to conflict with the existence of such a sea.

But when in the paper under notice, I read the learned Professor's description of the Kashkanatao Hill, on the lower Amú Darya, I must beg leave to submit to those of your readers who are interested in the matter, evidence which points to an entirely different conclusion from that arrived at by Monsieur Barbot de Marny. He says, "The western slope is steep and forms two terraces .... The lower of these terraces terminates in peculiar cap-shaped hillocks, some of which are quite isolated. These are generally ascribed to the waves of an ocean, which travellers imagine to have existed here, but they are evidently due to atmospheric erosion, the progressive action of which can be traced on the spot." As in the case of the sand-hills, the Professor refuses to see in these hillocks at Kashkanatao any traces of the existence of an ancient sea, and as I am certainly one among the travellers alluded to, whose belief is thus combated, I shall now give one reason why I assert the traces at Kashkanatao to be due to the waters of an ancient sea.

In July 1874, I visited the Kashkanatao Hill and noticed that the cap-shaped hillocks alluded to, possessed regular horizontal traces of from 3 to 6 feet broad, which encircled them in steps. I had never heard of their existence before, and am inclined to think I am the first European who ever noticed them, and I judged by eye that they were from 30 to 40 feet higher than the edge of the water of the river which ran at the foot of the hill. Some months afterwards, the levelling operations executed on the Amú told me that these terraces would be about 63 feet above Lake Aral, by taking the mean of the heights I had estimated them to be. Their provisional height above the sea will therefore be 222 feet.

Now seventeen degrees of longitude, or 850 miles due west of the Kashkanatao Hill, is situated the plateau of Cholon Komyr, upon the north of the channel of the Manytsch, by which the basins of the Black and Caspian Seas are connected. The height of this plateau is 222 feet above sea level, and just below its summit the learned naturalist Pallas found the beach of the ancient Caspian Sea. To say the least of it, the presence of these traces of an ancient ocean, at the same elevation, though separated by an interval of 850 miles, is very remarkable, and is some *prima facie* evidence of the former existence of an Aralo-Caspian Sea, in tolerably recent times.

But Professor Barbot de Marny says that the appearances at Kashkanatao are *not* due to aqueous, but to atmospheric action. As to this, let your readers judge from the following. Having ascended one of these cap-shaped hillocks, I found the level part of their horizontal terraces as well as the surfaces of the promontories, by which some of them are joined to the hill of Kashkanatao, to be composed of a thin layer of soft sandstone, which showed very distinct ripple marks. I dug up a piece of this beach, about 12 inches square, and 2 inches thick, and returned to camp with my prize. I had no theory whatever at the time, regarding an Aralo-Caspian Sea, and did not recognise the significance of a ripple-marked beach in such a position. Nevertheless, I had a vague idea that this piece of sandstone should be recognised as an actual ancient beach, if the fact could be possibly established.

Entering my *kibitka* with the stone in one hand, and a geological handbook, containing a woodcut of a ripple-marked beach, in the other, I placed them on a table silently side by side. My two companions of the moment naturally looked eagerly to see what the matter in question was, and one of them, who was certainly the least possessed of the three persons present of any geological knowledge whatever, immediately and without hesitation said "Why they are exactly the same thing!" It would be difficult, I think, to adduce stronger evidence that the stone actually *did* form the beach of an ancient sea, which formerly included the Aral and Caspian basins.

Professor Barbot de Marny states that the cap-shaped hillocks are situated on the west of the Kashkanatao Hill; but they are, in fact, just at its south-west corner. In this position, the traces in question would have been sheltered in smooth water under the lee of the hill, and have so been preserved from the action of the waves of the ancient Aralo-Caspian Sea, which would have been raised by the N.E. gales that prevail in these regions. This explains why these traces of a former sea, which evidently escaped the Professor's notice, exist at this spot only. It is difficult to understand how the traces I have described can be, "evidently due to atmospheric erosion, the progressive action of which can be traced on the spot." The cap-shaped hillocks are invisible elsewhere in this neighbourhood, and Professor Barbot de Marny advances nothing whatever to show why such traces "of atmospheric action," should be so curiously localised at the Kashkanatao Hill.—Yours faithfully,

HERBERT WOOD.

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THE REVIVAL OF DUTCH ARCTIC EXPLORATION.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—The interest with which you view whatever relates to geographical research, may warrant me in addressing you for the purpose of urging the propriety of the despatch of a Dutch Arctic Expedition, and the renewal of the enterprises of Holland in a field where she formerly won such renown. This subject is one in which I have taken particular interest; and late recognitions of its importance encourage the belief that an appeal through your pages may prove of great weight. Perhaps, too, one may, as a citizen of what was once known as New Netherland, speak with not less hope of being heard, next, at least, after one of their own nationality; and certain I am that the country which boasts its Kane, its Hayes, and its Hall among explorers of the American Polar regions, and as the real pioneers of the promising route chosen for the present English Expedition, would rejoice not less than England to see the countrymen of Linschoten, of Heemskerk, and of Barents awaking to renewed zeal in this field, and emulating their old adventurous spirit and activity.

There is no doubt that the Dutch possess to a remarkable degree the qualifications essential to the successful prosecution of Arctic investigation. Habituated from the infancy of their nation to battling with the waves, their many discovery enterprises, and their wide-spread colonization of the globe has accustomed them to distant voyages, and upon almost every sea; and if for upwards of two centuries they have surrendered to other countries all practical scientific efforts in the far northern waters, they have to re-inspire them to Arctic enterprise a heritage of brilliant deeds in past times. Though limited to a short period, the literature of the Dutch descriptive of their northern voyages is perhaps the richest of any nation's in truly romantic and thrilling story. What country, indeed, has not adopted into its language Gerrit de Vere's faithful narrative of the three voyages of Barents? And what Hollander is not stirred to the very soul by the grand poem of Tollens, portraying, in graphic verse, the scenes of the memorable third voyage, and the wintering in Novaya Zemlya? Thus, in both their prose and poetic literature have the Dutch immortalised their Arctic heroes. The fame, moreover, of that early authority in magnetic and cosmographic lore, the indomitable Plancius, who spurred his countrymen on to the renewal of efforts officially stayed by the States General, will endure so long as the literature of the Netherlands shall remain to furnish for it a fitting shrine.

But now another Plancius is needed to incite the slumbering ardour of the Dutch to new enterprise: another Barents to follow up and complete the researches of the first. The enthusiasm of the race that gave to the world such men sleeps for the moment, awaiting, it may be, the distinct and persuasive utterance of tongue and pen, gifted with true eloquence, to call it once more into play. Yet the field which Barents, Linschoten, Heemskerk, and the rest made peculiarly Holland's own lies invitingly open to her, and her people possess those characteristics which specially fit them for the resumption of their old-time work. "It is even possible," as I have elsewhere suggested, "that success would sooner crown the equipment of an expedition commanded by so competent a scientific officer as Commodore Jansen"—though it is not unknown that Holland has begun educating younger officers of her navy in ice navigation—"than that which under Captain Nares has recently quitted the shores of England. However unanimous may have been the opinions among English Arctic explorers and men of science as to the route chosen for the 'Alert' and 'Discovery,' it is well known that high scientific authorities even in England have inclined decidedly to the route which lies between Spitzbergen and Novaya Zemlya, upon which Barents, with a persistence that now seems to have been prescient of later discoveries, sailed to nearly the farthest extent that has been reached.

"But England had the best of rights to choose the route she has selected. The last distinctive attempt on the part of her navigators to reach the Pole was made by the gallant Parry in a line directly north from Spitzbergen, and Parry's experience was, we confess, rather confirmatory of continued ice than of 'open water.' It must, however, be here borne in mind that he was not pursuing his object upon any idea of a thermal passage existing to the Pole; and his famous sledge journey was prosecuted at a distance of some hundreds of miles west of the European flood-gate of the Gulf Stream. But it is to the renewal of Dutch Arctic enterprise in friendly rivalry with England, rather than the fitting out of an expedition to pursue any route we might prescribe, that we would urge the people of the Netherlands. The choice of routes may well be left to the Dutch geographers, though it would be wise that the radial points of attack should diverge considerably, and the practicability of a passage upon the bosom of the Gulf Stream might for once be fairly tested.

"There are, moreover, reasons in favour of a renewal of Arctic enterprise on the part of Holland which, appealing specially to her people, are happily wanting to other countries. The ancient landmarks whereby discoverers were wont in past ages to distinguish the lands and seas first sighted or traversed by them, are in danger of being removed, and names effaced from the charts by later hands, unrestrained by reverence for those whose posterity omit to keep alive the spirit of research. The age that has given to Barents' Sea the designation by which it is now known, has also witnessed the substitution of new names of points, capes, sounds, inlets, straits, and islands for those which would have borne down to future generations not only the nationality of the discoverers, but also the approximate period of discovery. In this respect Holland suffers an injury, which should excite her people to seek redress—redress that is most capable of being found in the resumption of the work of exploration at the North."

That enterprise is not dead among the Netherlanders is placed beyond doubt by the stupendous magnitude of their own internal improvements, such as the new ship canal to Amsterdam, the railway over the Meuse, connecting Rotterdam with the south, and the vast project of draining the Zuyder Zee, not to speak of the grand and expensive scheme of the Dutch Government itself for the purpose of inland defence, nor of the enterprises of real moment in their rich empire of Insulind. Moreover, intelligence has but recently come to me that Enkhuyzen is formally moving with a view to this business of Arctic research. A number of the "most influential residents of Enkhuyzen," states *Het Vaderland*, have, as members of the Geographical Society, constituted themselves into a department; the object being principally the renewal if practicable of the Arctic whaling business, and the advancement of science which must result from that work.* The announcement appropriately closes with the words, "May the example given by Enkhuyzen arouse others to follow!" Fitting it is, surely, that the citizens of this ancient trading port of the Netherlands, whose zeal in this field of research is already historic, should now be foremost for a renewal of Dutch Arctic enterprise. That history may further repeat itself in this matter, may we not next see her old southern rival Middelburg come forward once more as a genuine ally of her northern neighbour? Nor can the capitalists and leading citizens of Amsterdam remain indifferent in this matter. The city of Plancius and of Barents, like that of Moucheron and the adopted home of Haarlem's Linschoten, is able to wield a most potent influence in forwarding such objects, and from her abundant wealth could well add to her stupendous home enterprises that of practical Arctic investigation. And even for the bringing about of a Government Expedition—the kind demanded for really effective Arctic work—this zeal and encouragement on the part of towns and individuals are not less necessary.

Writing with the firm conviction that there will be a Dutch Arctic expedition—for I cannot believe that I misinterpret the real spirit of the Dutch people, nor estimate too highly the evidences favourable to this belief—I feel assured that too much importance cannot be attached to the results likely to accrue therefrom; knowing that Holland possesses the men thoroughly competent to direct such an enterprise and to achieve and weigh results.

The numerous discoveries to the west of Greenland in the Arctic zone, which have been made within the last thirty years by England and America, attest what can be done by determined effort in this direction. What then may not be done in the much wider field on the European side, now an unexplored waste upon the map? Men from the great neighbouring state to Holland, steering their way in the almost hopeless direction of the east coast of Greenland, achieved results with which the nation appears to be well satisfied; planting high in those regions the German standard, and placing many names on the chart of those latitudes to mark the presence of explorers from this comparatively inland state. Those "border provinces" of the European Polar regions, Sweden and Norway, have hardly ceased since the days of the Northmen from the pursuit of new investigations; the former threatening, under the guidance of Professor Nordenskiöld, to realise to us the dream of the old merchant adventurers; while it is to the latter that Holland is herself indebted for the finding of the priceless relics of her unfortunate Barents. Explorers even from the south have also won noble trophies on this northern field. The Austro-Hungarians, having their sea-view limited mainly to the waters which penetrate the city of Marco Polo, smitten with a desire for Arctic research, have found their way to high latitudes, and these adventures on their part have not been without signal advantage to science, as the name of Emperor Franz Josef's Land bears witness; and I but echo the assertion of a distinguished Dutch geographer in saying that there are not a few men in Holland who yearn for the opportunity of giving to some great unnamed spot in these ice-bound regions the designation of "Prins Hendrik's Land." S. R. VAN CAMPEN.

2, VERNON PLACE, W.C., *December 18th*, 1875.

* I owe this interesting piece of information to the kindness of one of the editorial staff of *Het Vaderland*, who is aware of my interest in this subject, and in the event of a Dutch Arctic Expedition being despatched that nation will be to no small extent indebted to this journal.

Proceedings of Geographical Societies.

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THE ROYAL GEOGRAPHICAL SOCIETY.

Meeting of November the 29th, 1875.

THE PRESIDENT, SIR HENRY RAWLINSON, took the chair at 8.30 P.M. Among those present were the Baroness Burdett Coutts, Sir T. Fowell Buxton, Bart., Sir Samuel Baker, Captain Burton, the Rev. Dr. Moffat, Mr. Alderman M'Arthur, M.P., Admiral Ommanney, the Rev. Mr. Hutchinson, Mr. Edwin Arnold, F.R.G.S., of the *Daily Telegraph*, and others.

After a few preliminary remarks by the President, Colonel GRANT proceeded to read his paper

ON Mr. H. M. STANLEY'S EXPLORATION OF LAKE VICTORIA NYANZA.

He said: The journey recently made by Mr. H. M. Stanley, the commissioner of the *Daily Telegraph* and *New York Herald*, is one of the most important and brilliant that has ever been made in Central Africa, or, indeed in any other country. For, when we consider that he accomplished it so quickly, taking only nine months from the time he left England, it seems at first as incredible as was his famous discovery of the late Dr. Livingstone. It is not alone the short time, but the great geographical question which he has finally settled —namely, he has confirmed Speke's discovery, that the Victoria Nyanza was one vast inland fresh water sea—he has navigated its shores for 1000 miles, thereby proving that its waters are continuous.

Before remarking upon Mr. Stanley's letters, Colonel Grant alluded to the knowledge we had of the great lake previous to the time when Mr. Stanley visited it.

The lakes of Central Africa were known to geographers as far back as the year 833, for in "Tabula Almamuniana" of this date, also in Abul Hassan's map of 1008, we have the Nile rising from one Lake "Lacus Kura Kavar;" and in the latter map we have mention of M. Komr (Mountains of the moon) at latitude 7° S. Several old maps, showing the lakes with their effluents, have been referred to in Lelewel's Géographie du Moyen Age.

Other more modern maps might be quoted, but during the last century map-makers seem to have left out all the lakes of Central Africa, and it is only in the last fifteen years that the centre of Africa has again been studded with its lakes.

In the year 1857 the Royal Geographical Society sent Captains Burton and Speke, both officers of our Indian Army, to explore Africa from Zanzibar *viâ* Lake Nyassa, to Egypt. Thus it was that we first heard of Lakes Tanganyika and Victoria.

Captain Speke, in 1858, went twenty marches north of Kazeh, alone, with seventeen natives, to test the Arab rumour that a great ocean which they called a bahr, or sea, existed. He found that the Arab traders had informed him correctly; a lake of almost unbounded extent stretched away from him to the north; there was, he was told, as great breadth of it on his left hand as there was on his right. He returned to England and presented his map of the discovery of the Victoria Nyanza to this Society, accompanying it with his belief that the waters he had seen were those of the Nile—but this had yet to be proved. The President for the time was the late Sir Roderick Murchison, who at once grasped the subject, and said, "Speke, we must send you back again."

Many months' preparation for his next expedition passed slowly to Speke, but at length, in 1860, he and I started from Zanzibar with 200 followers. It will give some idea of the fickle African when I tell you that we had only 40 men of the 200 when we reached Kazeh, 430 miles west of the sea-coast. Three-fourths had deserted us. We need not, therefore, be alarmed by the report of Mr. Stanley that one-half of his men were non-effective. He will enlist others, or do with fewer.

Months of weary delay again took place on the way between Kazeh and the hilly region of Karagweh, on account of the difficulties thrown in the way by the inhabitants. We wished to get on quickly, and tried to march near the lake, but were told that the ordinary route *viâ* Usui must be kept. We accordingly went that way, and crossed the watershed at 2½° S. lat. From this position we descended the northern incline of Equatorial Africa, and never left Nile-land till we reached the Mediterranean.

After leaving Karagweh, the country, bounding the lake on the west and north, to the capital of Uganda, may be generally described as a plain 4000 feet in altitude, but worn away at intervals of from 1 to 10 miles, with narrow excavations made by streams falling into the lake. The route may be likened to the teeth of a saw, the points being plains and the depressions swamps. We had extensive views of the lake from these plains; seeing its bays and islands, but no peaks nor distant ridges nor mountain-cones to the east, nothing but a clear sea horizon was visible, and no native could tell who lived beyond this sea.

The bays and long inlets of water or firths, seen by us on the western and northern shores, were M'werooka, Katonga, Murchison, &c. Some were completely landlocked, and 20 miles in length; I allude to the one seen near our camp at Uganda capital. It is here, probably, that Colonel Long, of the Khedive's service, found himself the other day, when he reported that Speke's Victoria Nyanza was merely a small affair of 30 miles in extent.

The greatest river on the route between the most southern point of the lake, round its western and northern shores, is the Kitangule Kagœra, in the district of Karagweh. It rises probably from the foot of the conical mountain of M'f'oombiro, supposed by us to be 10,000 feet high; numerous lakes and valleys send their waters to it. In appearance it has a slow, majestic, winding course, which is navigable for 30 to 40 miles from its mouth; vessels drawing 25 feet of water could, I believe, float at the ferry where we crossed.

I should not be the least surprised to hear that Mr. Stanley selects this noble river as a point for exploration. With the 'Lady Alice' he can ascend this stream from the lake up almost to King Rumanika's door; or he can cross over the mountains of Ruanda and Urundi and descend to the spot on Lake Tanganyika where Livingstone and he had such a pleasant picnic; or he may select the Albert Nyanza as his field for exploration. All will be new to us; either route would interest geographers intensely, for the country, its people, and its animals are all unknown.

Leaving the river Kitangule, and proceeding north to the capital of Uganda, a distance of 125 geographical miles, we counted five-and-twenty streams, varying in depth from 3 to 10 feet, which we waded, swam, or crossed by bridge; there were numerous other smaller ones which would not give trouble even when flooded. They were mud-colured and mud-sided—swamp rivers, in fact.

The area of the lake, according to Speke, is 645 geographical miles in circumference and if we add to this the circumference of Lake Bahr-ingo, now said to form a portion of the lake, we have 910 geographical miles.

Here it may be as well to explain that some geographers never accepted Speke's lake as one great ocean, although the geographical world did. The foremost of unbelievers, and the one who appeared first in the field, was Captain Burton, the companion at one time of Speke. He did not seem to have any reason for his argument. He said there must be several lakes, lagoons; anything, in fact, except *the* lake. Even the late Dr. Livingstone and Mr. Stanley made out there must be several lakes. Livingstone wrote in a very patronising tone, "Poor Speke had turned his back upon the real sources of the Nile"—"his river at Ripon Falls

was not large enough for the Nile"—and was disparaging of Speke's discoveries. The work of Dr. Schweinfurth, *The Heart of Africa*, has fallen into the greatest blunder.

The Colonel here enumerated a number of maps in which the Victoria Nyanza is divided into two lakes, and then proceeded to make some comments on Mr. Stanley's journey.

Starting from Zanzibar, in the month of October 1874, with 300 followers, he made a rapid journey of 720 miles to the south-east corner of Victoria Nyanza, performing this distance in 103 days, inclusive of halts. Through forests, across deserts and rivers, he conveyed the 'Lady Alice,' in sections, and launched her on the lake. The forethought and energy required to convey this boat must command the fullest admiration, for in doing so he has navigated the Inland Ocean, and given us a thrilling account of its extent, its rivers and shores, and its beautiful islands.

On the 27th of February last he obtained his first view of the great sea, and it can be imagined how impatient he must have been, and how hard he and his men must have worked to put the 'Lady Alice' together, to have a short trial on the lake before taking to sea in her.

Of the rivers which he observed during his voyage round the south, east, north, and west coasts, he gives, commencing with the most southern and proceeding northwards, the Monunguh, Luwamberri, and Duma; these three join and form the Shimeeyu. The Ruana falls into Speke Gulf, and is made 90 miles in length; 50 miles farther north comes the Mara, 70 to 80 miles; 12 miles north there is the Mori; then in succession, the Shirati, Gori, Ugoweh, and Yagama. In all, ten rivers are in the map. The only one described—the Leewumbu, or Shimeeyu—seems to be the only important river. It rises in 5° S. latitude, and 35° E. longitude, runs a course of 170 miles, where it and two others join to form the Shimeeyu, which extends for 100 miles farther. The width of the Leewumbu in the dry season is 20 feet, and depth 2 feet. Mr. Stanley gives great importance to the Shimeeyu, saying its course is roughly 350 miles, that it is 1 mile wide at its mouth, and 400 yards across above the mouth. This river may prove to be the most southern waters of the Nile. But the River Ugoweh, at the north-east corner of the lake, must be a considerable stream also, for hippopotami were seen in it. No remarks are made on the other streams.

We therefore have but one great stream on the whole length of the eastern shore of this great lake; and we know that on the western shore there is the same coincidence, namely, the Kitangule-Kagœra, the only river which obliged us to cross by canoe. The River Katonga we heard much spoken of as a troublesome stream, but I do not think it can be navigable from the bay.

It seems as if the great brown plains, which Mr. Stanley speaks of as bounding the lake to the east, drank up all the rain that falls upon them. Everywhere he heard of plains to the east; even the "Towering Table" mountain of Majita or Mazita, east of Ukerewe Island, was seen to be surrounded by plains; also the island-like mountains of Ururi, Uramba, and Shashi, they, too, had their plains; but all these being within a radius of 40 miles I take it they are remains of an old plateau, being 3000 feet above the level of the lake. There is a similar table mountain at Cheysimbee (mentioned in Stanley's map) on the opposite coast, but it is only 400 feet above the plain.

The mountains of Ugeyeya are called gigantic, for Mr. Stanley says, "We pass between the Island of Ugingo and the gigantic mountains of Ugeyeya, at whose base the 'Lady Alice' seems to crawl like a tiny insect, while we on board admire the stupendous summits." There is nothing as to size or summit on the other side of the lake to compare with this description of the equatorial mountains of Ugeyeya. This seems to be rather a mountain region, for to the east of the "Bridge" or Basalt Isles, a "flat and slightly wooded district, varied at intervals by *isolated cones*," was visible from the summit of the isle. Manyara, at the north-east angle of the lake, on the eastern side of the bay, is "a land of bold hills and ridges, while the very north-eastern end, through which issues the Yagama River into the Nyanza, is flat."

Having examined all the notes on the mountains of the east coast, we can say that there are no mountains, no volcanic cones, to be compared with them as to their height and proximity to the lake on the west coast. I therefore cannot but conclude that the fairway of the lake will be found on the east coast, and that the miles of swamps and shallow water in the west do not exist to the same extent on the other shore. But this interesting question will, I trust, soon be settled when we receive Mr. Stanley's observations on depths.

No fewer than sixty to eighty islands may be counted upon Mr. Stanley's map, dotted generally in clusters all round the shores, at distances of 2 and 3 miles from the mainland. The largest in the whole lake is Sesseh, which we made 40 miles in length, or as Mr. Stanley calls it, Sassa: it has an area of about 700 English square miles. The dimension of this one island will give some idea of the importance of this inland sea, which is probably the largest body of fresh water—at this altitude—in the known world.

Captain Speke attached the Lake Bahr-ingo to his lake at its north-east corner. The Rev. T. Wakefield places it 50 miles detached from the lake; but Mr. Stanley inquired of the natives regarding it, and was told there was no lake in that direction. However, considering that the native information obtained by the two former gentlemen has proved to be correct in most cases, and that it was obtained independently, on this account I do not give in to the non-existence of the Bahr-ingo Lake. He mentions that the River Ugoweh joins the lake here, and is of considerable size. Hippopotami were seen there by him, and it may be the water communication which Speke heard of as connecting the Bahr-ingo with the Nyanza. There is also the Yagamy here.

Regarding the altitudes taken by Mr. Stanley, we find that in leaving the desert plain of Ugogo, he ascended to another plateau, 3800 feet; again, as he proceeded north-west, he came on a still higher one of 4500 feet, and his greatest altitude was 5100 feet, which is the watershed between the lake and the sea-coast. This last height corresponds with the highest *inhabited* country Speke and I traversed in our journey, namely, the capital of Karagweh, which approaches to within 50 miles of the W.S.W. end of the lake.

The height of the Nyanza above the sea was 3550 to 3650 feet by one aneroid, and 3575 to 3675 by another. A further observation by Mr. Stanley, with two boiling thermometers, made the altitude, subject to correction, similar to Speke's, namely, 3808, or 68 feet in excess of Speke's observations. The difference is insignificant, and we may accept them as the established altitude of Victoria Nyanza.

The area of Victoria Nyanza, as made known to us by Mr. Stanley, proves that Speke far underrated its extent. I have carefully measured the maps of both travellers with compass to ascertain their existing difference, measuring every 10 miles, and the result, by this rather rough means, obtained is as follows:—Circumference of Speke's Lake, 645 geographical miles; circumference of Stanley's Lake, 890 geographical miles. If we add 265 geographical miles, the circumference of the Bahr-ingo Lake in Speke's map, we get 910 miles as one body of water—a curious similarity, in circumference, to Stanley's single lake—only 20 miles of difference.

Colonel Grant concluded the reading of his paper in eulogistic terms on Mr. Stanley's journey, considering him a worthy representative of the energy which sent out such an expedition.

Sir SAMUEL BAKER said, when old African travellers like himself were placed on the retired list, one great

pleasure remained to them—to watch the efforts and praise the energy of those younger explorers who were following in the paths which the older ones had marked out. He had come up to the present meeting from the West of England on purpose to render all the praise that an old African traveller could to the immense energy displayed by Mr. Stanley. At the same time he also felt great pleasure in meeting other African travellers. He had always advocated fair play among them; and though there had been some little rivalry between them, he was perfectly certain that nearly every traveller who had started from this country had done so with the honourable ambition of carrying out what he considered to be his duty to this Society, and above all, his duty as representing the integrity and determination of Englishmen. He admitted that he owed much of his success to the map Speke had given him when he met him with Colonel Grant in latitude 4°, and which was now in the possession of the Society; and as he had always supported Speke's view, it was a proud moment to him to find that it had been verified almost to the letter by Mr. Stanley. All must regret that in this hour of triumph Speke was no more; but his fellow traveller, Colonel Grant, and all his family, must feel that this day added to Speke's undying reputation. Many persons might have forgotten the discussion that took place in that hall in January, 1874, upon the report that he had received from King M'Tesa's envoys, who told him that there were two great lakes, one being named Sessé; that there was a channel between them; and that it was a day's hard work for a canoe to pass through. Colonel Grant stated that Sessé was an island, and that, therefore, there must be some mistake. Mr. Stanley's account, however, had shown that there was no mistake. It was most natural for the natives to describe the portion close to M'Tesa's capital north of the island as the Sessé Lake, just as Mr. Stanley had heard that Bahringo—instead of being a lake, as Speke thought—was a country. As they called the water near Sessé the Sessé Lake, so they called the water near Bahringo the Bahringo Lake. They were perfectly right in saying that there was a channel, and that it was a day's journey for a canoe to pass through into the second great lake. This showed how careful travellers must be in receiving geographical information from the natives; though Burton, Livingstone, Speke, Grant, and himself had done their best, there still remained some disputed points. At the same time, there was always some truth in native hearsay, if it could only be ferreted out. It had now been proved that Speke and Grant were perfectly right in saying that the river issuing from the Victoria Nyanza was the Nile, although they did not pass along the Nile the whole of the way down. Colonel Long, of Colonel Gordon's Expedition, had been up to M'Tesa's, and had published a map, which had been very properly criticised by Colonel Grant. Of course Colonel Long did not mean to take the wind out of Speke's sails, but he had certainly taken the water out of the lake, for he said it was only 15 or 20 miles broad. Of course that was utterly absurd; but at the same time he stated that he had found the sources of the Nile in some enormous lake near Unyoro. He (Sir Samuel Baker) had been there, and knew that at certain times of the year the whole of that country was in the same state as some parts of England had been during the last few mouths. If the natives of Africa had been in the neighbourhood of Bridgwater during the last fortnight they would have shown on their maps a very large lake as existing in the centre of England. Stanley had not only proved the enormous size of the lake, but also the great difficulty of navigating it with hostile tribes on its shores. It was now proved beyond doubt that the Victoria Nyanza was a great basin receiving effluents, varying in magnitude from both east and west; and that from that great centre the Nile issued and fell into the Albert Nyanza.

Captain BURTON remarked that Mr. Stanley had had the rare happiness of satisfying both the contending parties—those who believed that the Victoria Nyanza of Speke was a single lake, and those who were of opinion that the area covered by it consisted of one great lake and several shallow ones. From the accounts of the Arabs in 1858-59, he (Captain Burton) laid down the lake as 240 miles in length by 80 miles in breadth. In his publications he would only allow the part to be put in which had been actually surveyed, and he considered that he was right in taking that course. In a subsequent volume, on the sources of the Nile, he also inserted the parts that had been actually seen. His objection was not to the size of the lake, because the lake that he had laid down was just as large as the one navigated by Mr. Stanley, but to a lake with three or four distinct outlets. Speke had marked Mazita as an island; but following the assertions of the Arabs, he (Captain Burton) had put it on the map as a headland, as was now proved by Mr. Stanley to be the case. The existence of lakes to the north-east, and possibly to the east of the Victoria Nyanza was still extremely probable. The Mombas missionaries had heard of the Isamburu Lake, and of a volcanic region that was far too distant from the coast to be fed by sea-water, and too far from the Victoria Nyanza to be connected with that lake. He still regarded it as possible that the Tanganyika might be connected with the Nile. Sir Samuel Baker had stated in his last most charming book that he had very precise details from the Arabs and natives about a water passage between the Tanganyika and the Albert Nyanza. Dr. Livingstone had also seen the current in the former flowing north for some months. Since then Lieutenant Cameron had discovered the mouth of the Lukuga. He could only say that he did not believe in Central African lakes with two outlets; but at present the evidence was that Tanganyika in the dry season was still water, but that in the rainy season it shed its water to the north and west. He would not say that that was impossible, and he still lived in hopes that by some curious possibility the Lukuga would be found to be the ultimate source of the Nile.

Mr. EDWIN ARNOLD (of the *Daily Telegraph*) thanked the speakers for the encomiums they had passed on the labours of Mr. Stanley, and the meeting for the applause with which they had received them. If it were possible for him to communicate at once with Mr. Stanley, he was sure that a copy of the speeches just delivered would cheer him more than beads, or boats, or provisions, or anything else that could be sent him. He also thanked the meeting on behalf of the proprietors of the two allied papers which had sent out the expedition. The last words that Mr. Stanley had written, and that had arrived in this country were, "I am in perfect health, thank God. The Nile sources and their atmosphere make me stronger and stronger, and increase my energy; my last word to you is *en avant!*"

Mr. HUTCHINSON (Secretary of the Church Missionary Society) said the subject of sending a mission to Central Africa had long occupied the attention of his Society. It was owing to their missionaries that geographical enterprise was first started on the eastern shores of Africa, and the Society now honestly contemplated the possibility of responding to the call which Mr. Stanley had forwarded from King M'tesa. No doubt there were great difficulties in the way, but every possible care would be taken and every detail carefully planned. They did not anticipate so much hostility from the natives as Sir Samuel Baker had spoken of, and they hoped that Colonel Gordon's Expedition would be of great assistance to them. One friend had given 5000*l.*, and another had promised 3000*l.*, showing that there was a feeling in the country in favour of honest and earnest efforts to carry the Gospel to the natives in that part of the world.

The PRESIDENT said Mr. Stanley had been much more fortunate than travellers in general. Almost all others, especially in Africa, had had to wait for the end of their labours before getting the credit for them; but

Mr. Stanley, fortunately for geography and for himself, had been able to substantiate a great claim on the consideration and the applause of geographers by the work which he had already done in connection with the Victoria Nyanza; though that was only part of the work which he had in hand. From the Victoria Nyanza he would prosecute his researches farther towards the west, and in all probability he would repeat on the Albert Nyanza the same achievement which he had carried out on the Victoria Nyanza. Sir Henry then read a series of notes relating to Colonel Gordon's Expedition, which was followed by a few remarks from Sir Samuel Baker on the Albert Nyanza and Tanganyika, he being of opinion that they formed one immense ravine. The meeting then broke up.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

AT the monthly meeting on the 5th (17th) November. M. Semenof, the Vice-President being in the chair, a welcome was accorded to Messrs. Nordenskiold, Lundström and Stuksberg, the members of the Swedish Arctic Expedition despatched by Mr. Oscar Dickson of Gothenburg, on their entry into Russia, after successfully making their way from Norway to Siberia by way of the sea of Kara and the Yenisei River. M. Semenof delivered a highly complimentary address, in which he dwelt on the great geographical importance of Professor Nordenskiold's journey, and of the commercial route it might help to open up. M. Nordenskiold then gave an account of his voyage, which had been equipped at the cost of Mr. Dickson for the purpose of mapping out accurately and scientifically those portions of the Arctic regions which were only known vaguely through the accounts of Norwegian fishermen. Professor Nordenskiold was of opinion that that part of the ocean would always be found free from ice in the month of August, and for a few days in September. He mentioned also that he had found an excellent harbour at the mouth of the Yenisei, and that he proposed to call it Port Dickson. He was distinctly of opinion that the new route would in time be found of great commercial importance to Siberia, a view which was endorsed by subsequent speakers.

A grand meeting of the Society for the Encouragement of Commerce and Industry, of the Society for the Encouragement of Merchant Shipping and of the Technical Society was held on the 10th (22nd) November, in order to welcome Professor Nordenskiold and his party. After reference had been made to the former efforts of Nordenskiold and Wiggins, a complimentary address from each body was presented to the Professor, who, in his turn, gave a narrative of his journey. An announcement was then made by M. Latkin, that he was prepared to award a prize of 2000 rix dollars (113*l.*) to the first traveller who should succeed in reaching the mouth of the Obi, by the route followed by the Swedish Expedition.

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VIENNA GEOGRAPHICAL SOCIETY.

THE Society held its first meeting since the autumn recess on the 26th October, Dr. F. von Hochstetter, the President, being in the chair. After referring to the loss sustained by the Society in the deaths of its honorary member, Sir Charles Lyell, of its two corresponding members, Dr. Carl Andrée, of Dresden, and Professor Oscar Peschel, of Leipzig, and of some ordinary members, the President introduced to the meeting M. W. von Moltheim, late Government Commissioner at the Paris Geographical Congress; Dr. Woyeikof, the meteorologist, on his way to India and Japan, and M. Wainof, secretary of the ethnographical section of the Imperial Russian Geographical Society in St. Petersburg.

The President announced that Herr Marno had returned from the Upper Nile to Khartum, and from thence had made a hunting excursion to El Obeid, and had obtained some extensive collections. He had opened communications with Ismaïl Pasha, with the object of procuring leave to enter Darfur, but in this hope he was disappointed and had to content himself with a journey through Kordofan, from whence towards the close of the year he proposed to return to Khartum.

The President then gave a sketch of the Paris Geographical Congress, briefly touching upon its general organization and the distinctive excellence of some of the sections, and giving an enumeration of the rewards gained by the Austro-Hungarian Section, amounting to 51 in all, viz., six letters of distinction, 20 medals of the first class, 16 medals of the second class, eight honourable mentions, and a gold medal for Messrs. Payer and Weyprecht. Carefully compiled notices of the papers read in the various sections, and of the objects exhibited in the several groups, have been contributed to the October *Mittheilungen*, by Messrs. von Hellwald and Chavanne, respectively. The President conveyed the formal thanks of the Society to the various gentlemen, from the Minister of Education downwards, to whom it was indebted for their help in forwarding the interests of Austria and Hungary at the Congress.

The subject of the following meeting, it was announced, would be the travels of Drs. Rohretz and Rein in the interior of Japan.

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PARIS GEOGRAPHICAL SOCIETY.

December 1st, 1875.—M. Malte-Brun in the chair. A letter from M. Masquerey was read, who was about to make excavations at Timsad, in Southern Algeria, and at other places in the Jebel Auras. M. Masquerey's explorations are directed to the archæology and ethnology of Algeria. M. Desgodins then communicated to the Society a series of meteorological observations made by his father, the well-known Abbé Desgodins, at Bathang. The latter proposes soon to return to his old post at Yerkalo.

M. T. J. Rodrigues, on behalf of the Portuguese Marine and Colonial Ministry, stated that they were anxious to exchange publications with foreign governments and scientific societies. M. Malte-Brun said that a most valuable collection of documents bearing on the history and geography of the Portuguese colonies had already been received by the Society. M. Largeau then read a paper on his proposed expedition to the Central Sahara.

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